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MAKING YOUR MICRO WORK

JUNE 1988

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COMPUTER AFTERTHOUGHTS FOR BUSINESS

Handheld Computers



Neostar 286 • Business Speciality Package Reviews
W/Processor for Kids • Tornado Notes • Mouse Driver
PS/2 Model 80 • HyperCard • Assembly Language

Everyone says "It's the best there is."

Any cell can contain a complete other spreadsheet that you can access with a single key.

Don't take our word for it. Use Lucid 3-D for 60 days. Return it for a full refund if not completely satisfied. Plus, instead of the \$299 list price, an introductory spread-the-word price of \$199

Lucid is as simple as the pictures show. And you don't have to write formulas to do that. All you do is look at the other file, navigating through easy, point and shoot directories. When you come back up (with one key) the link is made automatically for you.

Everything about Lucid works that way. Users say "It is so intuitive that I really don't need a manual." That's because we use something we call a visual command menu. Jim Seymour, the noted PC columnist, talking about Lucid in a recent article said, "If there ever was an interface idea so good it ought to be stolen and widely used, this is it."

Memory Resident

You can pop Lucid up instantly while working in your word processor or any other program. You can cut anything on the screen and paste it right into Lucid, or cut anything from a Lucid worksheet and paste into the application below. You can even run Lucid on top of 1-2-3 if you like, and cut and paste information from one to the other, including formulas.

Notepad Behind Every Cell

Another 3-D feature is that any cell can also contain a multiple page note window that you instantly access with a single keystroke. You can write notes, memos or letters that relate to your work, save them as individual files and even print them separately or with your spreadsheet.

Other Features

Lucid has over 100 innovations that cause users to say it is the best of all the spreadsheet offerings! Things like: **Speed** - background, minimal and visible recalc. **Macros** - learning macros, autoexecute macros, macros work between spreadsheets, user defined macro menus. **Mouseability** - total Mac-like mouse access, but easy keyboard control as well. **Color or Mono** - 17 user controlled color displays. **Audit** - six displays and printouts. **Windows** - multiple sheets on screen at

same time. Multiple views of the same sheet. Pop-up windows of function formulas, range names, favorite labels, macro names, file names, even a calculator. All let you select and insert right



Fig. 2. Here we are instantly. Notice the lower left corner showing we are on level 2. Grey - takes you back. There is no limit to the levels you can go. Move right down to transaction level if you like.

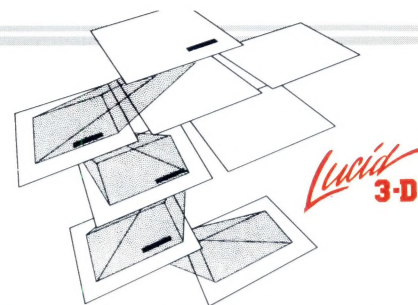
into your spreadsheet. All windows (even notes) resize and move where you want them. **Cut and Copy** - between spreadsheets, documents and between sessions. **Help** - press F1 anywhere, you get help specific to what you are doing.

Masterwork

Lucid is more than a bag of features. It is a masterwork. The overall feel is tight and polished. In fact, Paul Somerson, executive editor of PC Magazine, used one word to describe it, "Slick".

PCSG has built an excellent reputation as a developmental laboratory. Now those who have worked with Lucid 3-D tell us "you have done it again. This is software everyone should have."

Even if you don't plan to abandon 1-2-3, Lucid makes sense. Files are converted between them with ease so there's not



"The Best idea I've seen for a spreadsheet in years"

Jim Seymour, Columnist, PC Magazine, PC Week

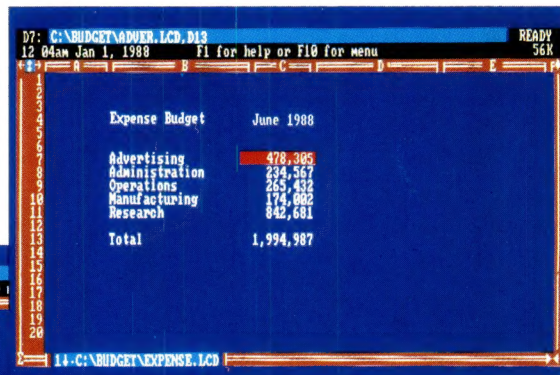


Fig. 1. Let's get the detail on those ad costs, just move the widebar to that cell and press one key (grey +).

Co-Winner of the 1987 PC Magazine Award for Technical Excellence
The other winner: Microsoft's Excel

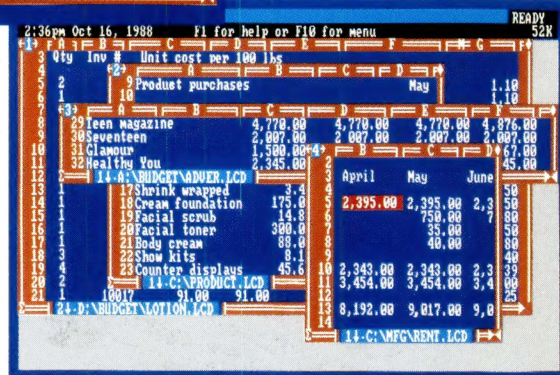


Fig. 3. Of course, Lucid does multiple windows. Notice, you can simultaneously open windows in different directories, different drives, even down as many 3-D levels as you like. No one else can do that.

an interoffice compatibility problem. This means you can have the power and fun of Lucid 3-D, without having to upset your present systems.

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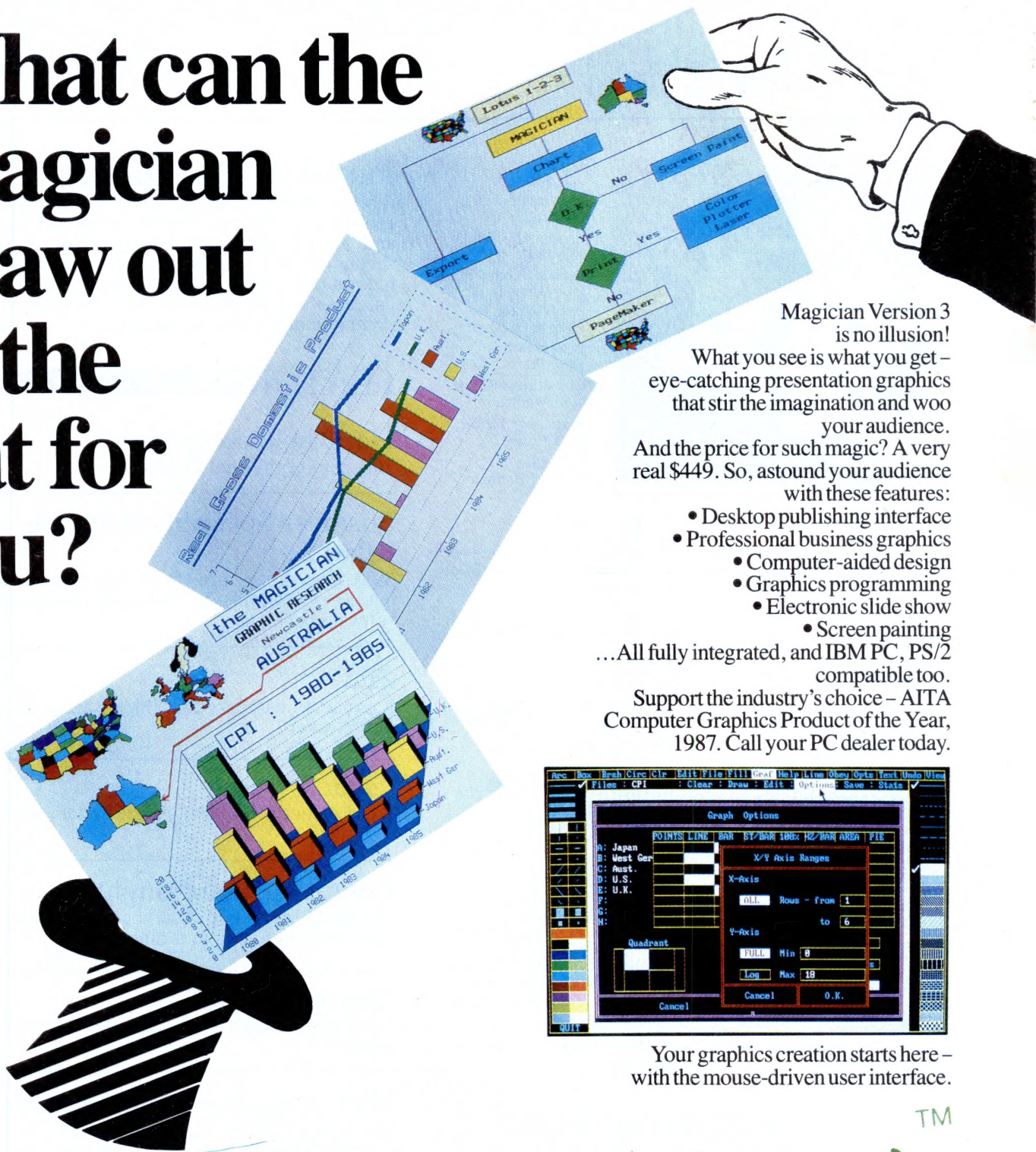


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(INTRODUCTORY OFFER OF \$199 FINISHES 30th JUNE 1988)

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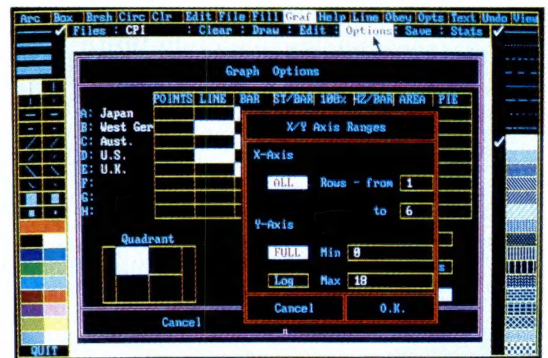
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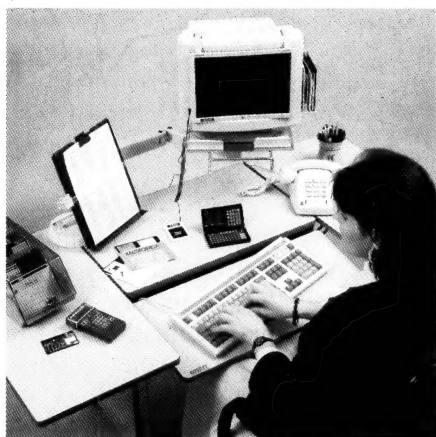
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SPORTBY

YOUR COMPUTER
is published monthly by
The Federal Publishing Co Pty Ltd,
180 Bourke Rd, Alexandria 2015.
Printed by Hannanprint,
140 Bourke Rd, Alexandria 2015.
Distributed Nationally by
Newsagents Direct Distribution
Pty Ltd

*Recommended and maximum
price only.
ISSN 0725-3931.

NEXT MONTH INCLUDES

The release of dBase IV in July will undoubtedly cause a stir in the database world as competitors position themselves to knock Ashton-Tate from the number one spot. We've asked Steve Keen to survey the current offerings in databases – from simple 'card indexes' to full blown relational offerings and dBase IV itself.

July also marks *Your Computer's* seventh birthday – we've asked peripatetic Phil Tripp to tell us from his mobile office just how far we've come since the days of 'Microcomputing's Model T' (June '81). We've also included articles on two more computing landmarks in July – the first part of Stewart Fist's HyperCard tutorial and a discussion of the 80286's modes. Plus a look at a new generation of printers and the Ideal Terminal.

Hand held computers

It all started with a room full of mainframes, which evolved into shelf-sized minis, then desktop machines and, after 30 years, portable computers. Now we are seeing the next step in that evolution. Robert Thirlwell reports on a credit card sized phone book, a pocket database, a word processor for your briefcase and a programmable personal organizer.

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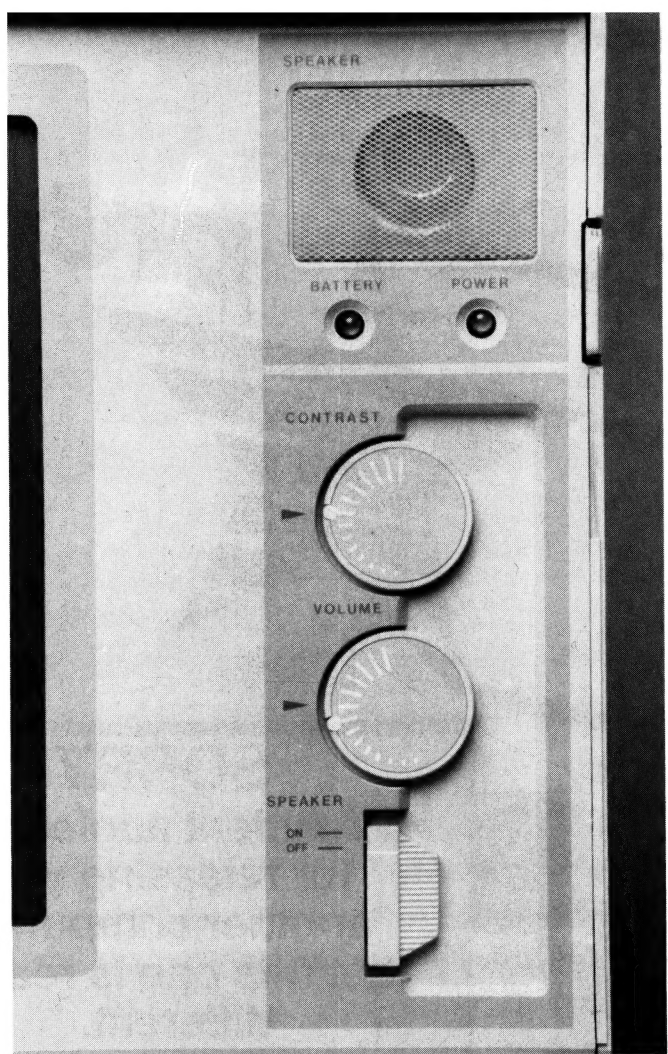
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The first honest software sales outlet ...

president

**Maker
of the
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OF THE
YEAR**

SORRY
**President apologize
for releasing yet
another computer
but this one is really
different.**

Introducing the PC88 Computer

This PC of the future has everything a company computer should. With its three processing speeds at a 0 wait state, 640K RAM built-in, three different ports, and many optional enhancements to select from, the PC88 is the compact computer for all of today's personal, business, educational and technical applications.

At the heart of this intricate PC is the 16-bit 8088-10 microprocessor, offering operating speeds of 4.77, 7.15 and 9.54 Mhz. To condense the PC88, President's Engineers utilized Faraday's FE2010A IC chip to replace 71 devices, which include six peripheral controller IC's.



This low energy design computer consumes only half the power consumption and can operate on a 70 watt power supply.

Specifications

- 16 - Bit 8088-10
- Microprocessor 4.77, 7.15, 9.54
- Zero wait state
- 8087 math co-processor optional
- 640K Ram 8K Rom Bios
- 1 x 360k 5 1/4 inch drive
- 1 x 720k 3 1/2 inch drive
- 4 x 8-Bit Slots
- 1 x Serial Port
- 1 x Game Port
- 1 x Parallel Port
- Programmeable speaker
- Real Time Clock
- MS-Dos 3.2

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A slight error . . .

WE MADE a slight error in one of the sidebar panels in last month's Personal Computer of the Year announcement. We explained the various criteria used in the judging of the award, and noted each of them was given equal 'weight'. We lied . . .

The fact is we place very heavy emphasis on one aspect: *advancement of the state of the art and influence on future trends*. What we're looking for is innovation, leadership, imagination – machines which define the future of personal computing.

We believe there's not a lot of point in us restricting ourselves to the 'computer most likely to succeed' as PC of the Year – after all, its success will be its own reward. Marketplace performance will always be a far better indicator of a machine's ability to 'win' the popularity stakes than any award. That's not to say our winners aren't likely to succeed – just that the likelihood of marketplace success doesn't weigh too heavily on our minds.

This has some side effects, both fortunate and unfortunate. In the fortunate category is the fact that awards like this – based on technical excellence and innovation – help encourage the advancement of the industry. Almost anyone can build a saleable computer, but how many can build an exciting one? We also believe an award based on our criteria gives our readers an advance look at the type of machine they can expect in their future purchases – a sort of silicon crystal ball.

Another positive note is the selection of finalists – we consider that step in the PC Of The Year process to be our 'buyers guide' for the readers. The selection of finalists is our nomination of the cream of the previous year's releases, and as such is an excellent guide to the top newcomers. You must always remember, however, that a machine already on the market before that time – or even a clone of one of the leaders – may better suit your own needs.

On the 'unfortunate' side (depending on who you are) is that more often than not, the winning machine will be expensive – out of the reach of a majority of our readers. How many of us can afford a Macintosh II as a personal computer? Sure, many of us desire one, but fewer have the dollars to lay on the table.

We have to accept in our judging that advances cost money. They require new chips, new components, extra design efforts. The first company to use

the latest in processors, in fast hard disks, in high-speed memory, pays dearly for the privilege – as low-volume items they cost five, ten or twenty times as much as they will a year later, and the support components to go with them are just as expensive.

For that reason PC of the Year may not necessarily be the right machine for you to buy at the time – but you can usually bet on buying it (or something based on its innovation) a year or two later. Of course, in many cases it is the right machine for you – we just want to emphasise the fact that we're not saying it has to be . . . Take some of our past winners as examples – these days, many of them would be considered 'dogs', yet a lot of the benefits we enjoy today came from them.

NEC's original APC is a classic example – it quickly became an orphan after a period of brisk sales success. But the features it embodied – high-resolution screen, graphics, high-capacity disks, a high-performance processor – pre-dated similar developments in the 'mainstream' by quite some time.

Hewlett-Packard's 110 portable was another winner with a 'limited' future, especially in the market covered by this magazine. But just take a look at the booming laptop market today – and compare the design concepts to the H-P – and you'll see it was an innovator which set the scene for the years ahead. Before the H-P, laptops were dinky toys which worked differently to our 'real' PCs, and were only useful in limited applications such as journalists on the move.

H-P brought DOS to the laptops and started a whole new market segment which has culminated, only in the past year, in a booming market for a style of machine that once looked like it 'would never fly'.

Apple's Lisa is perhaps the best example of all – a total market flop (purely because of its price), but it set the scene we are still seeing unfold. Try convincing yourself that every manufacturer in this business isn't heading towards the friendly/powerful graphical interface concepts brought to the mass market by the Lisa and then the Macintosh.

All this and more is bundled into this year's winner, the Mac II, which extends the definition of user-friendly power, lays new ground-rules for the future, and – most importantly in Apple's case – brings open architecture to this once closed shop.

MATT WHELAN

American Graffiti

For long-term survival, businesses must continually find new new products to sell. That's obvious: as more people buy spreadsheets, for example, there are fewer people to whom you can sell a spreadsheet. Now that basic computer software needs – word processor, spreadsheet, telecommunications and so on – have been met, vendors have to find ever more specialized niches in which to sell products. For a long time, in the mainframe world, creating 'niche' software meant that you took, for example, a regular old billing system, changed a few key screens from 'XXX Company billing system' to 'XXXX Hospital billing system,' changed the cover pages on some of the manuals, and peddled it to hospitals. *Voila* – instant niche software. Basically, only the vendor's people knew what the game was, and buyers were ecstatic at having software that seemed addressed specifically at their needs. In their joy, they never noticed the rough edges, the failure to meet their *specific* needs.

For example, to adapt a regular billing system so that it can be sold to interior decorators, the vendor will undoubtedly have to pay special attention to the layout of the bill – perhaps adding some curlicues or multicolour something-or-other to the way the bill is printed. Probably interior designers will have to be consulted to find the most aesthetically pleasing way to lay out bills, screens, and other visual material so that it meets the often zany criteria of that business.

I was put in mind of this by a wonderful scientific (not to mention legal) breakthrough recently; Harvard University Medical School researchers laboured and brought forth – a mouse! I kid you not! But this was not just any old common house mouse. It was a mouse created using genetic manipulation techniques, for which the researchers were granted the first patent on a life form by the US Patent Office. Several aspects of the announcement turned my mind immediately to computers.

For example, some of our adolescent hackers haven't heard those awful words that poison mature minds – 'can't be done' – and so are capable of some quite imaginative work. Imagine the thrill of using bio-Cad software to become the first

kid on your block to develop, say, a parakeet that can croak like a frog... or a dog that can walk itself without the assistance of an adolescent owner.

While we're on the subject of biology, another clever niche that vendors have recently developed is anti-virus software. We wrote recently about the pathological fear of computer viruses sweeping the US; obviously, developers were on the ball, because now there's an epidemic of anti-virus software sweeping the country, despite much evidence that viruses are a significant threat.

That strategy won't work in the microcomputer age.

Niches have already begun in word processing – spelling checkers, for example. An early niche was undoubtedly style checkers. One good niche I can see in word processing is a tool for lawyers – a kind of style-checker-cum-obfuscator. It would check a lawyer's output to make sure the lawyer never used one word where four or five would do. It would also make sure to throw in just enough words to confuse things for someone who was not a member of the legal fraternity. For example, it would scan for dangerous words or phrases such as 'guarantee' or 'will do the following' and automatically provide an out, by inserting the usual legal jargon such as 'no guarantee, express or implied, is made hereinunder...'

CadCam vendors will also undoubtedly realise what an enormous market there is for, say, plumbers. A CadCam package could easily be optimised for plumbers in the following way: as we all know, computer printouts are highly authoritative.

(Note to all CadCam vendors: This idea obviously has an almost infinite range of specific applications. I am advised by Counsel that this notice constitutes registration of this idea, for which I am asking for a modest 10 per cent of gross sales resulting from it.)

Hmmm... come to think of it, these

kinds of software would have applicability for many of us, and thus might not necessarily be categorized as niche software.

One of the great, waiting niches in the publishing/word processing arena is software that will help stretch material out. For example, as a rule, in writing business reports, the longer the better – too long is rarely a bad thing. Your boss may be used to reading reports of a certain length, although report writing is an onerous chore for most people. (This applies as well to writers and editors, of course: how do you suppose my my column always manages to come out the right length? I'm under strict orders to 'write long' so editor Kennedy has a few words he can trim to make my material fit.) Imagine specialized word processing software that would stretch out material without making it look obvious! What a great niche! (Actually, as some readers may have detected, I'm currently testing a prototype of this.)

Finally, in the grand tradition of computing using computing to build ever more sophisticated tools, a great waiting niche is software to discover (or create!) niches. A brief look at today's real niche software shows clearly that the niches have been there all along, waiting to be exploited – and in most cases, the chief reason it's taken so long for niche software to appear is lack of imagination by users and vendors. Niche software will examine certain key parameters and functions of existing software and suggest unmet functions – that is, waiting niches!

Today's niche software is not inexpensive, and as newer, even more niche-y (Nietzsche? Nitchy?) niche appears, it will not be any less expensive – vendors tend to market specialty products as high-end, high-priced items. A real-world model is medical specialisation, whose practitioners have been defined, with more truth than satire, as doctors who 'know more and more about less and less'. The important point is, they never come cheap. So, too, will be the trend for future niche software. But as any user of niche software knows, it's usually well worth the price. So don't be discouraged! However, there is one way consumers will be able to slash costs of that software, and that's to *Editor's note – Karten's column ran too long this month...*

CANBERRA COMMENT

Computerised defence tenders short circuit

Canberra computer company Priority Systems recently struck trouble with Tender Requests On Line (TROL), a defence tenders information system.

The TROL system works through Viatel Videotex with Priority Systems providing information about defence tenders throughout Australia. Subscribers can access information on specific defence tenders then contact the Defence Department in Canberra for details on projects that interest them. TROL was expected to provide most of the information, so earlier this year the Defence Department stopped mailing tender notices to companies. This was to have saved postage costs.

TROL runs by automatically tapping tender information from a Defence Department computer. Tendering companies pay \$300 a year for TROL. The advantage being that clients using TROL receive tender information up to two weeks before it is printed elsewhere.

However, the Public Service unions in Canberra pulled the plug on TROL refusing to update the tender information. The bans are over a proposed re-organisation of the defence tender section.

Priority Systems has been caught by the bans because it cannot charge its clients for out of date information. The company has lost about \$2500 a week while the bans continue.

Meanwhile, the Defence Department has stopped advertising the TROL service until the bans are lifted.

Government computer dollars on the rise

Over half of all hi-tech government business is now done in Canberra, according to recent figures. The only exception to this is Telecom which still does not tender in the national capital.

The combined total of Telecom and government computer contracts for the first half of the financial year 87/88 was \$200 million. This does not include communications and networking equipment.

The biggest buyer of computer hardware so far this financial year (excluding Telecom) is the Department of Social Ser-

vices, the value of its contracts being nearly \$40 million. Telecom spent nearly \$88 million.

The Defence Department was next with computer hardware contracts for \$10.7 million. The Department of Administrative services spent \$6.7 million, however it buys on behalf of other government sections.

Despite regulations requiring departments to publish their tenders in the Government Gazette, several seem to have understated their computer purchases. For example, Veterans Affairs at \$21,000 and Immigration and Ethnic Affairs at \$65,000 seem fanciful accounting.

Of the companies tendering for government computer contracts, Wang is well in front with hardware sales. Its contracts were worth about \$14 million for the first half of this financial year. Unisys is the second largest hardware supplier with contracts of almost \$3 million.

Overall computer packages (hardware plus software) change the picture. In this area Fujitsu leads with nearly \$34 million worth of government business followed by Wang.

IBM does well out of Telecom having nearly half of all its government contracts with it. IBM contracted over \$10.5 million of business overall with the government in the first six months of the financial year. However, smaller Australian computer companies are also being given a chance with major government contracts.

For example, the Department of Health and Community Services recently announced Impact Systems and Mica Computers would help set up their regional office network.

Department spokesman Neil Thelander said the network will allow regional office staff to check instantly on budgets for community services such as childcare and rehabilitation. The state offices will network with a mainframe in Canberra.

Impact systems is supplying 150 locally assembled laser printers while Mica is providing 300 Genstat PCs. Mica is also linked to Techway which is subcontracting some of the PC work.

Software for the network is coming from Oracle, a US company. According to Stephen Clark, a managing director of Oracle,

the software is designed with a three-tiered architecture. It is flexible enough to integrate spreadsheets, form generators and inquiry tools.

DEC is supplying six VAX minicomputers for the network. And, the US owned company is putting 30 per cent of its profits from the contract back into Australian computer research and development.

Baffling marketing talk

Many computer buyers, particularly first time ones often feel bruised and confused after sessions with computer marketing people. Perhaps you might like to know what goes on behind the scenes in computer marketing. Here is a brief translation of what they really mean.

Total Package – An all purpose word designed to create a professional image.

Flexible – This usually means the computer will do the job it's supposed to do.

Total Flexibility – Same as flexible but it is less likely to break down.

Totally Flexible – When it does break down there are other things you can do with it.

Potential – Needs a lot more work and money.

Revolutionary – The company or its products are just catching up with the competition.

Rationalisation – We've sacked half the staff, halved our product range and hope it's going to be enough.

Successful – Still in business.

Enhance – We've painted it a different color.

Unique – A white elephant.

Overall Marketing Strategy – We've just sunk \$500 into a bit of market research.

Diversification – Getting out before we go broke.

Future Plans – We have an appointment to see the bank manager next Tuesday.

Injection of Cash – We saw the bank manager last Tuesday.

Package – The computer will not sell by itself so we have thrown in a few extras free.

Totally Integrated Package – It still won't sell by itself so we have tacked it on to our other successful range of unique and revolutionary products to make it totally flexible. □

MICRO SALES

PERSONAL COMPUTING FOR BUSINESS

STAR
NX1000
W/CABLE

\$499

INC TAX

ULTRA 286
10 MHz
0 WAIT STATE
1MB RAM
30MB 28MS
HARD DISK
MONO
MONITOR

\$3495

INC. TAX

SOFTWARE

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Lotus 1-2-3	\$649
Excel	\$745
Silk	\$215

BORLAND

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Turbo ProLog	\$135
Turbo Basic	\$135
Turbo C	\$135
Sidekick Plus	\$280
Pascal Toolboxes	\$135

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Works	\$299
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- All products sourced from official Australian distributors
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- Call for any products not listed

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subject to change and stock
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Symphony	\$959
Q&A	\$485

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Paradox II	\$989
Fox Base	Call
Reflex	\$225
Rbase System	\$1055

QUATRO
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INC. TAX

GRAPHICS

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Harvard Graphics	\$599
Magician	\$390

UTILITIES

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Norton Advanced	\$215
Norton Commander	\$125
Xtree Pro	\$195
DS Backup Plus	\$175
TypeQuick	\$99
Disk Technician +	\$235

MICRO SALES
PERSONAL COMPUTING FOR BUSINESS

1ST FLR 579 HARRIS ST
(CNR MACARTHUR ST)

ULTIMO 2007

MICRO SALES

PERSONAL COMPUTING FOR BUSINESS

HARDWARE

NETCOMM MODEMS

Smart 1200 SA	\$589
Smart 123 SA	\$745
Smart 1234 SA	\$885
In Modem 2400A	\$545
In Modem 123A	\$499
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1MB RAM

UPGRADE PATH TO 386

MODEL 2112

12.5 MHz

1MB RAM

UPGRADE PATH TO 386

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12.5 MHz

0 WAIT STATE

UPGRADE PATH TO 386

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HAND HELD COMPUTERS

Forests of memos, letters, printouts forms and scraps of paper still plague our work places – what ever happened to the 'paperless office'? While the greater bulk of information is now stored and processed electronically, and computers are commonplace, there is still a mass of information that's stored in a different way: how often do we see someone sitting at a terminal decorated with little squares of paper – phone numbers, reminders, names and addresses, file numbers, and the name of that restaurant that serves up really cheap, delicious Italian food?

There is no denying that the humble paper scrap is a quick and easy solution for storing vital information, especially when you are holding the phone in one hand and a pen in the other, but it does tend to become lost in the build up: Where's that phone number? What's the company that what's-his-name works for who rang about whatever it was? There must be a better way to store these small pieces of invaluable data. A diary can be handy, or a notebook, or that fashionable extension of both, the Filofax.

Computers are made for storing information, and if you have access to a PC, you can use SideKick, Metro, or a similar utility, or simply use a word processing file for text entry. If you have a a portable, then you have the best of both worlds and, but for phone numbers, a \$2000 (at least!) portable seems a little like overkill.

In between low end laptops and high end calculators is an interesting area that includes pocket computers, hand held organizers, computers that fit into your briefcase, and a growing range of 'shirt pocket' calculators that will keep notes. These hand held minders can perform minor miracles ranging from keeping track of your daily schedule with reminder alarms and messages, to being fully featured portable word processors and databases.

The four we looked at are all under \$1000 – the Megalogic PD8000 calculator and personal directory is the cheapest at

It all started with a room full of mainframe, which evolved into shelf-sized minis, then desktop machines and, after 30 years, portable computers – now we're seeing the next step in the state of the shrinking art. Robert Thirlwell reports on a credit card sized phone book, a pocket database, a word processor for your briefcase, and a programmable personal organizer (but watch out when you change the batteries).

\$75, the Casio Digital Diary SF-4000 is \$279, the Psion hand held organizer is \$499 for the basic model, and the Z88, A-4 sized computer with a full sized QWERTY keyboard is \$906. For comparison, the cheapest portables are around \$1000 (for the Tandy 100 or the NEC 8401); for the cheapest MS-DOS machine, you pay about \$1900 (for the Toshiba T1000).

The variety of models within this range is growing, and as the technology develops and the cost of memory comes down, there is no reason to doubt that there is a lot of market potential in coming up with the right combination of size, display, keyboard, RAM and inbuilt pro-

grams. Specialist calculators have been around for some years now, with models from Hewlett-Packard, Sharp and Casio that cater for every variety of scientific and mathematical manipulation imaginable. Recently the Psion Organizer – a calculator that is also a database, diary, alarm clock, phone directory and more – from the UK has carved out a market niche of its own.

Many variables makes comparison difficult between the various machines that fit in the hand held category – they're all different to use, vary in portability, have different types of programs and amounts of memory. One important factor which is easily overlooked is whether your database of addresses, product prices, restaurant numbers and birthdays is kept safe and sound in power-backed RAM or in EPROM memory, so that when the time comes to change batteries, you don't lose the lot.

To explain this further – RAM (Random Access Memory) needs a continual trickle of power for it to retain what has been stored electronically. Hand held computers and calculators generally have their power supplied by batteries with a limited life of anything from several months to five years. When the batteries are removed, the memory is erased and you have to re-enter all of your information. This is not a problem if you're calculating the area of a circle or adding up the day's shopping bill, but when your stored information amounts to a database of important information, it can run into thousands of characters. The prospect of re-keying all of this information back into the calculator or computer every time the batteries need to be changed just isn't worth thinking about.

Manufacturers have found various solutions to this dilemma, including using separate battery-powered RAM modules which can be removed from the calculator without losing any information, and using EPROM (Erasable Programmable Read Only Memory) modules that do not require power for memory storage. Other



Figure 1. The Megalogic PD-8000 – 5 years' worth of 'personal directory' for \$75!

solutions include the optional mains power adapter. The Psion and the Casio Digital Diary each have a system that gives you a few minutes grace in which to change the batteries without losing information in RAM.

Calculators are available in many different sizes, configurations and prices. You can buy calculators the size of a credit card that can tell you the time, act as an alarm clock, convert currencies, compute compound interest, dial a phone, remember your credit card numbers and private bank numbers, keep a track of your cheque account, and perform calculations.

Megalogic PD 8000

The Megalogic 8000 is the size of a credit card and combines the features of an 8 kilobyte character alpha-numeric database with a five function calculator and a currency converter that remembers 6 exchange rates. It has 45 pressure sensitive keys including separate numeric keys, and a two-line 40 character LCD display. The main feature is the personal directory function which allows storage, retrieval, editing and erasure of files within the database. Any file can be any length up to the limit of available memory, but you are restricted to lines of up to 20 characters each. With 8000 characters available, assuming a four line name, address and

phone number entry, you can fit in at least 100 entries. Allowing for unused character spaces the number of entries would be around 130. With just names and phone numbers on two lines per entry, you are looking at 200 to 300 entries, which is a more than adequate phone list.

The personal directory has a security code feature which requires the entry of a three number code before access is allowed to chosen files. This is designed for the storage of personal numbers such as bank access PIN numbers, credit card numbers and anything else you want to keep secret. All files are stored in numeric and alphabetic order, and to access them, you press the DIR key to browse through them in order, or you can enter a search string for instant recall of files.

The Megalogic 8000 was designed for travelling. Apart from recording names, phone numbers and travel information, it can convert up to six different currency rates, retaining the ratios in memory. The calculator function is nothing out of the ordinary – it has the usual functions and a single memory that will retain a stored value when the calculator is turned off.

The best feature is its size: small enough to be stored in a credit-card wallet, it can be carried anywhere. It seems surprising, but there are 45 keys crammed into the space beneath the display. It can store the same amount of information as a personal address book and takes up less space. It turns itself off automatically after about one minute to conserve battery power, and if the entry you were working

on had more than 10 characters, the information will not be lost. Actually, when it turns itself off, it goes into a standby mode so that information in the memory is retained. The battery life is rated at approximately two years, but the publicity material claims five years. The truth is probably somewhere in between, and depends on how often the Megalogic is used. When the battery needs to be replaced, the information in memory is lost, and the security code resets itself when the new battery is installed. This is where EPROM memory modules as found in the Psion have an advantage over volatile RAM memory. Look at it this way, for \$75 you get an address book and calculator that lasts for up to five years before you need to replace its batteries and the information it contains. By then your database will probably need a bit of a re-shuffle anyway, credit cards will have become smart cards, and they'll all tell the time in 24 cities around the world.

Psion Organizer

The secret has been revealed: Alice kept her cool while the March Hare was always running late because she had a Psion – a hand held organizer that can tell you the time, act as a personal diary, remind you with alarms that you should be doing something else, and generally provide you with phone numbers, names and addresses, and the recipe of your girlfriend's favourite drink. It's all filed away safely in EPROM memory. The Psion has an inbuilt programming language, called OPL, an elaborate database program, also builtin, and it can be linked to a PC/XT/AT compatible computer via an optional serial connection – your MS-DOS applications can be programmed to transfer data to or from the Psion. This opens up all sorts of possibilities that are only just beginning to be explored.

The Psion XP in its basic form has 32 Kbyte of ROM and 16 Kbyte of RAM memory and holds around 16,000 characters (about twice as many as the Megalogic). The Psion looks like a large calculator or a remote control for a TV or video and it is designed to fit into the palm of your hand. With batteries, it weighs around 230 grams, which is a little on the heavy side for carrying around in your pocket.

It has 36 keys with the layout in alphabetical format and eleven of these double as numeric keys. Above the keyboard is a two line LCD display with 16 characters per line. A robust protective sleeve slips

over the lower part of the unit when it is not being used. It gives the impression of being solid enough to handle a few knocks and bumps, and unless you take it underwater or into a violent dust storm, it should survive pretty well. It has two slots at the rear that will accept Datapacks with up to 128 Kbyte of EPROM memory.

The maximum on-board memory (both ROM and RAM) with two Datapacks is 304 Kbyte. At \$431 per 128 Kbyte Datapack, this makes a total price of \$1361 for the XP fully configured. The Datapacks can be used to store data collected in the field, and when removed from the Psion they retain their information. They can only be erased and formatted using a special EPROM eraser, and they can be re-used after erasure.

When you first turn on the Psion you are presented with a menu that has the options Save, Find, Diary, Calc, Prog, Erase, Time, Alarm, Info, Copy and Reset. It is easy to begin entering, saving, editing and finding data. The Psion database is simple but quite adequate for most purposes. Each record can be up to 16 lines long and each whole record can contain up to 254 characters. It is possible to search the database for a character string using the Find command. If the number of characters on any one line exceeds 16 (the length of the display) then the line is scrolled horizontally, with scrolling controlled by cursor keys.

The diary function displays the date with time slot on the top line of the display, leaving the bottom line free for the diary entry. Pressing the right arrow key advances the day of the month, and the up or down arrow key adjusts the time slot in 30 minute intervals. When a diary entry has been made, you have the option of setting an alarm to go off if you want to be reminded when the time is approaching for the next appointment. The calculator is sophisticated enough to handle long equations with any number of bracket levels. Adding the OPL functions, provide you with SIN, COS and PI, and up to ten calculator memories can be accessed. These memories are retained until deliberately cleared or the Psion is reset.

There are a number of small design features that make the Psion a pleasure to use. To save the battery it switches itself off automatically after five minutes if you have not pressed any of the keys. No data is lost from memory and when you press the on/clear key you are returned to where you left off without having to go back to the main menu. The horizontal scrolling in both directions saves a lot of jumping around within the narrow display, and

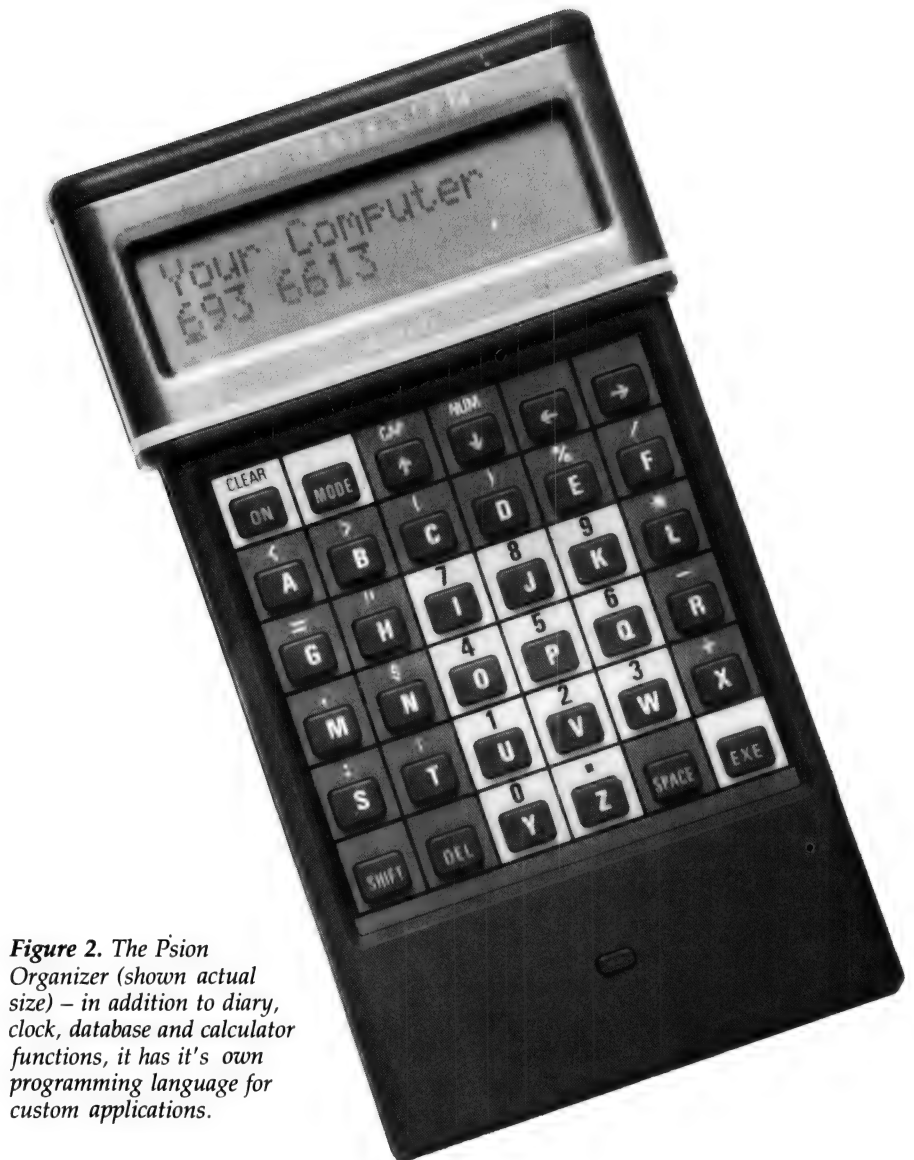


Figure 2. The Psion Organizer (shown actual size) – in addition to diary, clock, database and calculator functions, it has it's own programming language for custom applications.

once you have become used to it, it becomes second nature. Unlike the Megalogic, when the battery goes flat you do not lose any of your information (if it is stored safely in EPROM memory), and if it is in RAM (the diary and the main data file) the Psion turns itself off and retains enough power to keep things intact.

Once you remove the old battery you have 90 seconds to insert a new one before you lose the information in RAM. Alternatively, you can use the optional mains adaptor to power the machine while you change batteries. The battery is a standard 9 volt PP3 sized alkaline type which lasts two to six months.

Psions are being used in many different applications, apart from personal diary functions. In the UK, where the Psion

originated, they are used in a major department store to keep staff informed about prices and availability of products. Each evening the Psions are handed in and their information datapacks are updated, or new ones installed. They are also being used in the UK for point of sale checks by using the magnetic strip reader on customer's credit cards. In Australia, they are being used by security companies with a barcode reader – barcodes on the protected premises are read by the Psion which also records the time of the reading; the data is kept in the datapack and printed out at the end of a shift.

Optional extras include a bar code reader, mains adaptor, magnetic card reader, RS232 cable link, and EPROM copier, formatter, and eraser. Documentation is sim-

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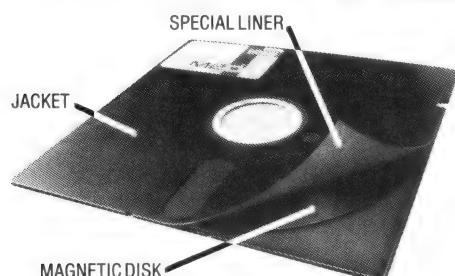
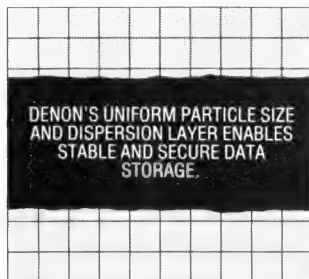
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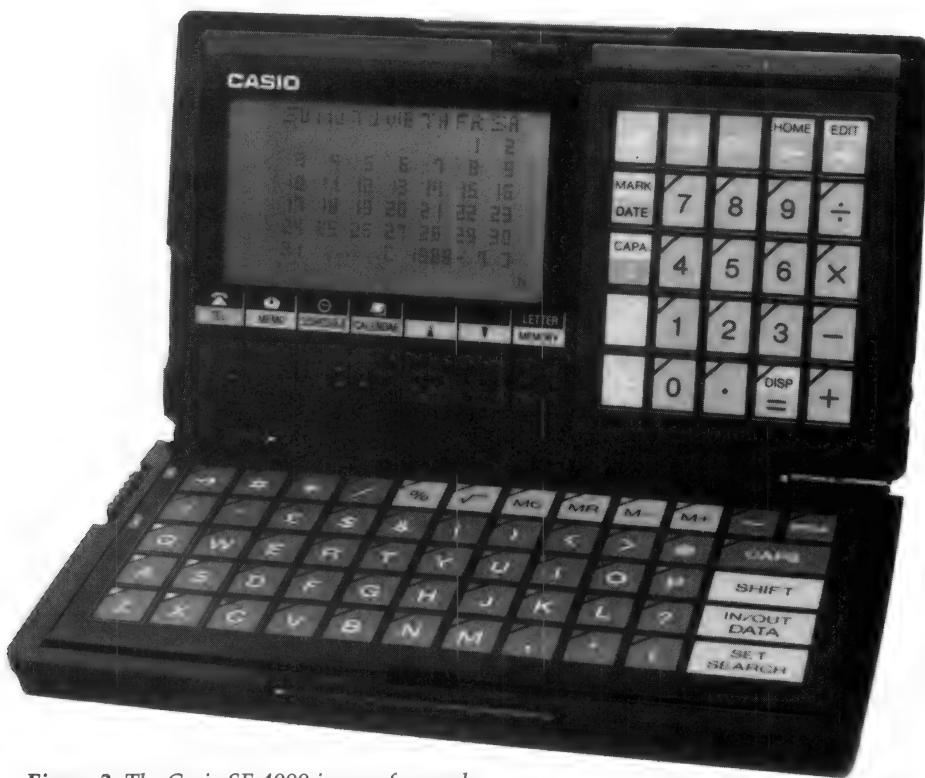


Figure 3. The Casio SF-4000 is one of several 'digital diary' models – including one that accepts handwritten messages and sketches!

and calendar functions are interactive, so that any one day can be highlighted on the calendar then have its schedule displayed by pressing the schedule button. Press the Memo button, and write yourself a message or two, or press the Tele button and access the telephone directory. The names under Tele are automatically sorted alphabetically, and can be searched by first word or first letter, or they can be scrolled using the up/down arrows. The search functions also apply to Memo and Schedule.

The display is a large 16 character by 8 line LCD matrix with a contrast adjustment for different lighting conditions. The screen is easily read apart from the usual problems of reflections from overhead lights that plague any screen. There is an auto-off function to save batteries, a calculator, and a secret function for those PIN numbers that you want to keep to yourself. The only thing lacking is a time function, with alarm, but Casio are probably working on that right now.

The Z88

The Z88 is a new model from Cambridge Computer in the UK (Clive Sinclair's new company). It is the size of an A-4 pad, just over 2 centimeters thick, and is ruggedly designed. It weighs about the same as a large book, and could easily be carried around in a briefcase leaving plenty of spare room. The top of the unit has a full sized QWERTY keyboard with arrow keys, caps lock, and four menu keys. The keyboard is rubber-coated, or rather, the keyboard is made of rubber, with the keypads activating pressure sensitive contacts beneath them. This gives it the ability to be taken almost anywhere, although there are a few small gaps which would let in water if you were to fall into the pool whilst updating your database.

The review machine turned up from Barsons with a note apologizing for the sand on the keyboard – Barson's Sydney man, John Treloar, had let his son use it in his sandpit. It was a simple matter to wipe it clean with a damp cloth, and it has been performing faultlessly.

The basic unit has 32 Kbyte of RAM and three expansion sockets for extra RAM or EPROM cartridges. The review machine was equipped with a single 128 Kbyte RAM cartridge. It is completely portable, and is powered by four size AA alkaline batteries, which give about 20 hours of active computing. Optional additions include a mains power unit, printer cable

ply the best possible, with a comprehensive manual written in easy to understand English (not surprising since the Psion was developed by English academics). A sizeable chunk of the manual is devoted to the OPL programming language, with examples of procedures and programs, so that users can access the power of this little computer. The database is already powerful enough for everyday use, but with a little extra programming, it can be configured to suit special applications. These facilities allow complete software control of the screen, keyboard, peripherals and datapacks.

Casio Digital Diaries

Casio has introduced several digital diary models including one (the IF-8000) with an electronic notepad. With this model it is possible to write a message (by hand), or do a little sketch on the display panel with a special pen, and it can be stored and recalled later. Up to 50 pages or 15,000 characters can be stored

in this way. The Casio SF-4000 is a close cousin without the sketch panel, but with more memory. With 32 Kbyte it is good value at \$279. It has the same amount of memory as the Psion and the Z88 in their basic non-expanded states.

It is lighter than the Psion and has its keyboard laid out in QWERTY fashion, which is far easier to use if you're 'keyboard literate' than the ABCDE layout. There is no provision for expansion or interfacing with other computers, and it does not come with an inbuilt programming language. It's powered by three lithium batteries with a rated life expectancy of 85 hours of continuous use. To make sure your saved data does not disappear when changing batteries, there is a builtin backup (as long as two of the three batteries are left in place at any time during the change over).

Casio has made an attractive package with this unit. The hinged case has the keyboard on one flap and the numeric keys on the other, next to the display. Function keys beneath the display put the user into data storage and recall modes allocated to telephone directory, memo, schedule and calendar. It has a full month calendar up to the year 2099. The schedule

(serial or parallel), modem, EPROM eraser and a package called PCLINK which consists of an RS232 serial cable and software to allow transferral of files between the Z88 and an IBM or compatible. There is also a link for communications with a BBC Micro. A single RS232 port on the side of the unit is the sole connection point for printer cables and for transfer and receipt of ASCII files and BBC Basic data.

The display is a supertwist LCD screen with eight lines of 80 characters each. Like the old Tandy 100, the screen is on the same plane as the keyboard, and to avoid reflections it is best to use the builtin stand to prop it up at an angle to the desk. Below the screen is a handy template that displays a quick reference to commands used in the applications programs. On the right side of the display is a micro representation of the document that you are working on, so even though there are only six lines being displayed at any time, you can see what the document will look like after it has been printed. At the left of the display is an area for menus.

Typing on the rubber keys feels a bit strange at first, especially if you are used to using an old rattler of a keyboard that makes noises every time you press something. The Z88's keyboard is almost silent to use (which could be an advantage in some situations) and it is like tapping away at a wetsuit until you get used to it. But, as mentioned earlier, the QWERTY keyboard is faster to use than the alphabetical layout on the Psion. Also, as I later discovered, there is a Panel menu that allows the user to alter defaults including selection of an audible beep when the keys are pressed. This also took a bit of getting used to, and it elicited 'What's that beeping?' from others in the office. Maybe something like a dull click would be a better feedback.

Software is included and ready to go,



Figure 4. The Z88 from Cambridge Computers comes complete with a full sized QWERTY keyboard, a full featured combination word processor, database and spreadsheet (Pipedream), and a List of Suspended Activities.

and it is simply a matter of booting the Z88 by pressing the two shift keys, and up pops a menu. Twelve applications are listed within the main menu, including Diary, Basic, Calculator, Alarm, and Filer. The principal program is called Pipedream, a wonderful name for any computer program. Pipedream is an all-in-one word processor, database and spreadsheet, and has a wealth of editing commands to give it the power to handle most applications. The other programs are pop-up utilities, such as Clock and Diary, and programs that enable communications and creation of your own printer driver, and the BBC Basic programming language.

From the main index, an application is run by selecting it from the menu when highlighted. If you enter Pipedream, the

default set-up is ready to accept a word processing activity such as writing a letter. All applications use menus to show the user what options are available at any stage. This makes the Z88 easy to use, but I found it necessary to refer to the manual at first for details on how to use the menus.

All of the usual word processing features such as setting margins, saving files, search commands, block commands and printing commands are accessible via the menus. For example, it is possible to select underlining, italics, subscript, superscript and bold from the Print menu either through using the cursor keys and the Menu button, or by using the control (called the diamond) key and other key sequences.

If you return to the Index while creating

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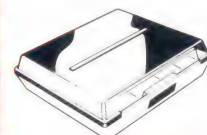
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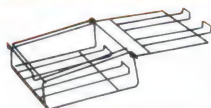
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Response Time: 10ns

Protection Level: 350V peak

..... **\$34.95**



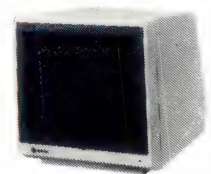
COMPUTER CABLE

- CIC6 6 conductor computer interface cable. Colour coded with braided shield (to IE422 specifications). Copper conductor 6 x 7/0.16mm 1-9 metres 10+ metres **\$1.90/m** **\$1.70/m**
- CIC9.100 9 conductor computer interface cable. Colour coded with mylar shielding. 9 x 7/0.16mm 1-9 metres 10+ metres **\$2.50/m** **\$1.95/m**
- CIC12 12 conductor computer interface cable. Colour coded with mylar shielding. 12 x 7/0.16mm 1-9 metres 10+ metres **\$2.70/m** **\$2.50/m**
- CIC16 16 conductor computer interface cable. Colour coded with mylar shielding. 16 x 7/0.16mm 1-9 metres 10+ metres **\$3.90/m** **\$3.40/m**
- CIC25 25 conductor computer interface cable. Colour coded with mylar shielding. 25 x 7/0.16mm 1-9 metres 10+ metres **\$4.90/m** **\$4.40/m**



TELECOMMUNICATION EXTENSION LEADS

- Cat. Y16010 5 metre **\$12.50**
- Cat. Y16012 10 metre **\$14.95**



SAMSUNG 12" 20MHz COMPOSITE MONITOR

- FEATURES...**
- High contrast, non-glare screen
 - High resolution, 80 or 40 character display
- SPECIFICATIONS...**
- Picture tube: 12" diagonal and 90° deflection
- Phosphor: Available in Green (P39) or Amber
- Video input signal: Composite Signal
- Polarity: Negative Sync
- Level: 0.5V-2.0Vp-p
- Scanning frequency:
- Horizontal: 15.734 KHz ± 0.1%
- Vertical: 50-60Hz
- Video bandwidth: 20MHz
- Active display area:
- Horizontal: 160(V)mm
- Vertical: 120(H)mm
- Display character:
- 80 characters x 25 rows
- Input terminal: RCA Phono Jack
- Controls:
- Outside: Power Switch, Contrast, Brightness, H-Shift, V-Size
- Inside: H-Width, H/V hold, H/V linearity, Focus
- Power supply: 110/120V 60Hz, 220/240V 50Hz
- Dimensions:
- 308(W) x 307(H) x 297(L)mm
- Weight: 7.3 Kg
- Shipping weight: 8.3 Kg
- Cat No. Description Price
- X14514 (GREEN) **\$149**
- X14516 (AMBER) **\$149**
- SPECIAL, ONLY \$129**
(10 OR MORE \$119 EACH!)



2 & 4 WAY RS232 DATA TRANSFER SWITCHES

- If you have two or four compatible devices that need to share a third or fifth, then these inexpensive data transfer switches will save you the time and hassle of constantly changing cables and leads around
- No power required
 - Speed and code transparent
 - Two/Four position rotary switch on front panel
 - Three/Five interface connections on rear panel
 - Switch comes standard with female connector
- 2 WAY Cat.X19120 only **\$59**
- 4 WAY Cat.X19125 only **\$99**

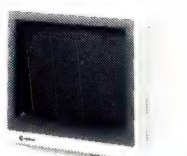
2 & 4 WAY CENTRONICS DATA TRANSFER SWITCHES

- Save time and hassles of constantly changing cables and leads around with these inexpensive data transfer switches. These data switches support the 36 pin centronics interface used by Centronics, Printronics, Data Products, Epson, Micronics, Star, and many other printer manufacturers.
- No power required
 - Speed and code transparent
 - Two/Four position rotary switch on front panel
 - Three/Five interface connections on rear panel
 - Switch comes standard with female connector
 - Baite locks are standard
- 2 WAY (X19130) only **\$59**
- 4 WAY (X19135) only **\$99**



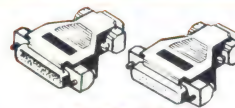
RS232 DATA SWITCH WITH TESTER

- No power required
 - Ideal for 1 computer to 2 peripherals or 2 computers to one peripheral
 - 25 pin RS232 "D" connectors
 - Six dual coloured LED indicators showing certain flow status:
- T.D. Transmit Data
R.D. Receive Data
R.T.S. Request To Send
C.T.S. Clear To Send
D.S.R. Data Set Ready
D.T.R. Data Terminal Ready
- Size: 200(W) x 68(H) x 150(D)mm
- Cat.X19110 R.R.P. \$169
Our Price \$149



SAMSUNG 12" TTL/COMPOSITE MONITOR ONLY \$179

- FEATURES...**
- At last a monitor with both TTL and Composite modes!
 - High contrast, non-glare screen
 - High resolution, 80 or 40 character display
 - Swivel/Tilt base
- SPECIFICATIONS...**
- Picture tube: 12" diagonal and 90° deflection
- Phosphor: Green (P42)
- Video input signal: Composite/TTL Switchable
- Polarity: Negative/Positive
- Level: 0.5-2.0Vp-p / 1.5Vp-p
- Impedance: 75ohm, more than 68K ohm
- Scanning frequency:
- Horizontal: 15.75 KHz ± 0.1%
- Vertical: 47-63Hz
- Video bandwidth: 20MHz
- Active display area:
- Horizontal: 160(V)mm
- Vertical: 120(H)mm
- Display character:
- 80 characters x 25 rows
- Input terminal: Phono Pin Jack
- 9 pin D-Sub Connector
- Controls:
- Outside: Power Switch, Contrast, Brightness, Signal Select, V-Hold, V-Size
- Inside: H-Width, H/V linearity, Focus, H-V Shift
- Power supply: 110/120V 60Hz, 220/240V 50Hz
- Dimensions:
- 308(W) x 307(H) x 307(L)mm
- Weight: 7.3 Kg
- Shipping weight: 8.3 Kg
- Cat No. Description Price
- X14509 (GREEN) **\$179**



9 PIN TO 25 PIN CONNECTOR ADAPTORS

- NEW! The ideal solution! Features gold plated pins
- X15668 DB9 Plug to DB25 Socket
- X15669 DB9 Socket to DB25 Plug
- each **\$10.95**



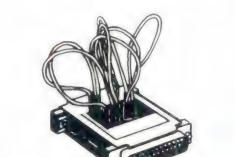
U.S. TO AUSTRALIAN TELEPHONE ADAPTOR

- Australian plug to U.S. socket
- Y16008 **\$8.95**



TELEPHONE CURL CORD

- U.S. plug to U.S. plug
 - Replacement hand set cord
 - Length 4.5 metres
- Cat. Y16023 **\$7.95**



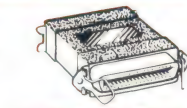
RS232 WIRING ADAPTOR BOX

- Male to female
 - 25 Detachable plug on leads
 - 2 mini jumpers
 - Ideal for experimenting or temporary connections
- Cat. X15665 Normally \$49.95
Only \$44.95



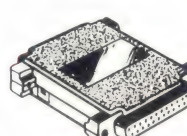
SAMSUNG TTL 12" MONITOR

- High contrast, non-glare screen
 - Excellent value for money!
- SPECIFICATIONS:**
- Picture tube: 12" diagonal 90° deflection
- Mode: TTL
- TTL input signal:
- Polarity: TTL Positive
- Level: 4V p-p ± 1.5V
- Impedance: 75ohm
- Video bandwidth: 16MHz (3 dB)
- Scanning frequency:
- Horizontal: 18.432 ± 0.1KHz
- Vertical: 50-55 ± 0.5%
- Active display area:
- Horizontal: 160(V)mm
- Vertical: 120(H)mm
- Display character:
- 80 characters x 25 lines
- Input connector: 9 pin connector
- Controls:
- Front: Power ON/OFF, Contrast
- Rear: V-Hold, V-Size, Brightness
- Internal: Vertical Linearity, Horizontal Linearity, Horizontal Width, Focus
- Power supply: 110/120V 60Hz, 220/240V 50Hz
- Dimensions:
- 308(W) x 297(H) x 307(L)mm
- Weight: 7.3 Kg
- Shipping weight: 8.3 Kg
- Cat No. Description Price
- X14500 (GREEN) **\$189**
- X14502 (AMBER) **\$189**



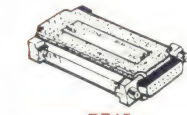
CENTRONICS GENDER CHANGERS

- Female to Female
 - Saves modifying or replacing non-mating Centronics cables
 - All 36 pins wired straight through
- Cat. X15663 Male to Male
- Cat. X15661 Male to Female
- Cat. X15664 Female to Female
- Normally \$33.95
Only \$24.95



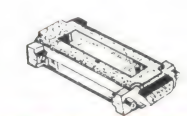
RS232 GENDER CHANGERS

- Saves modifying or replacing non-mating RS232 cables
 - All 25 pins wired straight through
- Cat. X15650 Male to Male
- Cat. X15651 Male to Female
- Cat. X15652 Female to Female
- Normally \$14.95 each
Only \$9.95



DB15 GENDER CHANGERS

- Saves modifying or replacing non-mating DB15 connections
 - All 15 pins wired straight through
- X15645: Male to male
- X15646: Male to Female
- X15647: Female to Female
- **only \$14.95**

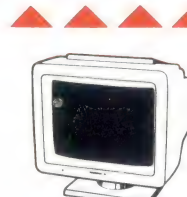


DB9 GENDER CHANGERS

- Saves modifying or replacing non-mating DB9 connections
 - All 9 pins wired straight through
- X15640: Male to male
- X15641: Male to Female
- X15642: Female to Female
- **only \$14.95**

STOP PRESS!

GOLDSTAR TTL MONITORS ONLY \$149 THIS MONTH ONLY!



THOMSON EGA MONITOR

- Top quality high resolution EGA monitors with a space-age design
- SPECIFICATIONS:**
- CRT: 14 inch (360mm) diagonal, 90 degree deflection
- Display Size: 245(H) x 180(V)mm
- Phosphor: P22, non glare, tinted screen
- Dot Pitch: 0.31mm
- Video Bandwidth: 18 MHz
- Resolution: 15.75KHz - 640 x 200
- 21.85KHz 640 x 350
- Input Signals:
- 1 RGBI - positive, H(+), V(+)
- 2 RGBBI - positive, H(+), V(-)
- Input Impedance: TTL Level (330 ohms)
- Dual Scanning Frequency:
- Horizontal: 15.75 KHz or 21.85 KHz
- Vertical: 50 - 60 Hz
- Connector: 9 pin, D-type
- Size: 312(H) x 363(L) x 380(W)mm
- Weight: 10.8 Kg (Net)
- X14525

ROD IRVING ELECTRONICS HAVE A HUGE RANGE OF DISCOUNT PERIPHERALS



RS232 FAST CABLER

Makes RS232 interface configuring fast and simple. 3 slide switches enable line swapping functions, positive and negative voltages are displayed on 6 tricolour LED's.

SPECIFICATIONS:

Connector: DB25 plug on 100mm cable and DB25 socket on 100mm cable.

Indicators: Tricolour LED's for pins 2(TD), 3(RD), 4(RTS), 5(CTS), 6(DSR), 20(DTR).

Switches: 3 Slide switches to swap leads.

Power: Interface power.

Enclosure: Black, high impact plastic.

Dimensions: 85 x 95 x 30mm

X15710 **\$145**



RS232 BREAK OUT BOX

A simple way of monitoring RS232 interface lead activity. Interface powered, pocket size for circuit testing, monitoring and patching. 10 signal powered LED's and 2 spares. 24 switches enables you to break out circuits or reconfigure and patch any or all the 24 active positions.

SPECIFICATIONS:

Connectors: DB25 plug on 80mm ribbon cable and DB25 socket.

Indicators: Tricolour LED's for TD, RD, RTS, CTS, DSR, CD, TC, RC, DTR, (E)TC.

Jumper Wires: 20 tinned end pieces.

Power: Interface power.

Enclosure: Black, high impact plastic.

Dimensions: 85 x 95 x 30mm

X15700 **\$94.95**

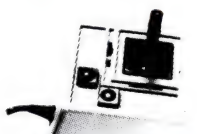


APPLE* COMPATIBLE SLIMLINE DISK DRIVE

Compatible with Apple 2+
Cat. X19901 Normally \$225
SPECIAL \$179

APPLE* IIC COMPATIBLE DISK DRIVE

(including cable **only \$199**



JOYSTICK FOR IBM

Features Selectable "Spring centring" or "free floating". Electrical trim adjustments on both axis. 360 degree cursor control.

Cat. C14205 **\$39.95**

APPLE* II SERIES COMPATIBLE JOYSTICK

These joysticks have adaptor connectors to suit the Apple II, IIC, IIE and IIG computers. Features include selectable "spring centring" or "free floating". Electrical trim adjustments on both axis, 360° cursor control and dual fire buttons.

Cat. C14201 **only \$39.95**



SCHMIDT 123AT MULTI STANDARD MODEM

- V21, V22, V23 Multi standard modem (300/300, 1200/1200, 1200/75)
- Auto dial "AT" command set (Hayes* compatible)
- Auto answer/auto disconnect
- Auto answerback (Similar to Telex)
- Auto or manual control
- Dial-up or leased line operation
- Pulse or Tone Dialing
- Automatic speed ranging
- Speaker for call progress monitoring
- Baud-rate converter with 48 character buffer (V23)
- Synchronous or asynchronous operation
- Fully self contained power supply
- Low power operation
- Metal case (R.F. shielded)
- Visual monitoring of important interface circuits (7 LED's)
- Full or half duplex (V23)
- Double adaptor plug to allow use of standard phone (Mode 1/3/5)
- Telecom Authorised (C87/37/65)

..... **\$595**

*Hayes is a trademark of Hayes Microcomputer Products Inc.



UV EPROM ERASER

Erase your EPROMs quickly and safely. This unit is the cost effective solution to your problems. It will erase up to 9 x 24 pin devices in complete safety, in about 40 minutes (less for less chips). High UV intensity at chip surface ensures EPROMs are thoroughly erased. (Dimensions 217 x 80 x 68mm)

WITHOUT TIMER

Cat. X14950 **Normally \$79**
Special, \$79

WITH BUILT-IN TIMER

Cat. X14955 **\$139**
Special, \$99.95



TELEPHONE ADAPTOR

- Australian plug to U.S. socket
- Length 10cm

Cat. Y16026 **\$6.95**



20 M/BYTE HARD DISK

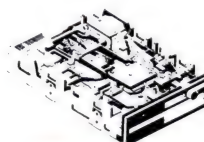
Tandon drive with controller card. IBM* compatible. Warranty Cat. X20010 **ONLY \$595**

40 M/BYTE HARD DISK

Seagate drive, IBM* compatible. 12 month warranty. Cat. X20020 **ONLY \$795**

80 M/BYTE HARD DISK

Seagate drive, IBM* compatible. 12 month warranty. Cat. X20030 **ONLY \$2,695**



NEC DISK DRIVES

3 1/2" DISK DRIVE

- 1 M/Byte unformatted, (640K formatted).
- Double sided, double density.
- Access Time 3m/sec

Cat. **\$255**

5 1/4" SLIMLINE

- Switchable 1.6 M/Byte to 1 M/Byte unformatted
- 1.2 M/Byte to 720K formatted
- Double sided, double density.
- AT compatible

Cat. C11906 **\$269**

8" SLIMLINE

- Double sided, double density.
- 1.6 M/Byte unformatted.

Cat. C11908 **\$785**



HEAD CLEANER DISKS

It only takes a minute amount of dust, dirt or magnetic oxide particles on your drive heads to cause problems: errors, downtime or an expensive service call. Regular use of a head cleaner will keep your drive free of trouble causing dirt and help keep your system up and running. These disk cleaners are simple to use, and include cleaning solution and instructions.

Cat. No. **PRICE**

C12560 3 1/2" **\$6.95**

C12555 5 1/4" **\$6.95**

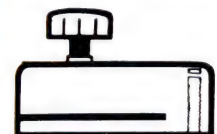


PRINTER LEAD FOR IBM*

- Suits IBM* PC XT and compatibles
- 25 pin "D" plug (computer end) to Centronics 36 pin plug

Cat. P19029 1.8 metres **\$14.95**

Cat. P19030 3 metres **\$19.95**



DISK NOTCHER

Converts 5 1/4" single sided floppy disks to double sided by placing an appropriate notch in the floppy disk jacket.

C21070 **\$9.95**



VERBATIM DISK SPECIALS!

All prices 10 disk boxes!

Description	1-9	10+
3 1/2" 1S/2D	\$44.95	\$42.95
3 1/2" 2S/2D	\$46.95	\$43.95
3 1/2" 2S/HD	\$109.00	\$99.00
5 1/4" 1S/2D	\$22.00	\$21.00
5 1/4" 2D/2D	\$26.00	\$24.00
5 1/4" 2S/4D	\$75.00	\$70.00
5 1/4" 2S/HD	\$42.95	\$41.00



MICRODOT DISKES!

Description	1-9 boxes	10+ boxes
3 1/2" 2S/2D	\$29.95	\$28.95
5 1/4" 1S/2D	\$12.95	\$11.95
5 1/4" 2S/2D	\$13.95	\$12.95

NOTE: Prices may vary interstate due to freight costs.

C16020 **only \$17.95**



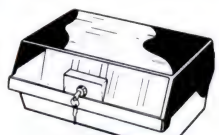
5 1/4" DISK STORAGE (DD100-L)

Efficient and practical. Protect your disks from being damaged or lost!

Features...

- 100 x 5 1/4" disk capacity
- Smoked plastic hinged lid
- Lockable (2 keys supplied)
- High impact ABS plastic base.
- Contemporary design

C16020 **only \$17.95**



JUMBO 5 1/4" DISK STORAGE (DD120-L)

If you have lots of disks, you'll appreciate the extra capacity of this disk storage unit when it comes to locating a particular disk.

Features...

- 120 x 5 1/4" disk capacity
- Smoked plastic hinged lid
- Lockable (2 keys supplied)
- High impact plastic base

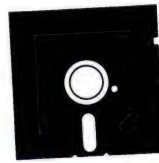
C16028 **only \$22.95**



3 1/2" DISK STORAGE (DD80-L)

- Holds up to 80 x 3 1/2" diskettes.
- Smoked plastic hinged lid
- Lockable (2 keys supplied)
- High impact plastic base
- Contemporary design

Cat. C16038 **only \$19.95**



"NO BRAND" DISKS!!

Now you can buy absolute top quality disks that are also the cheapest in Australia! They even come with a lifetime warranty! So why pay 2-3 times the price for the same quality?

Packs of 10, D/S D/D without boxes, or brand name, just their white paper jacket, and index labels (5 1/4" disks includes write protects).

5 1/4" "NO BRAND" DISKS

DOUBLE SIDED/DOUBLE DENSITY

10-DISKS 100-DISKS 1,000-DISKS

\$8.95^{ea} \$8.50^{ea} \$7.80^{ea}

(ALL PRICES PER 10 DISKS)

3 1/2" "NO BRAND" DISKS

DOUBLE SIDED/DOUBLE DENSITY

10-DISKS 100-DISKS 1,000-DISKS

\$27 \$26 \$24

(ALL PRICES PER 10 DISKS)



Rod Irving Electronics

MELBOURNE: 48 A Beckett St.

Phone (03) 663 6151

NORTHCOVE: 425 High St.

Phone (03) 489 8866

CLAYTON: 56 Renner Rd.

Phone (03) 543 7877

SOUTH AUSTRALIA:

Electronic Discounters P/L

305 Morphett St. ADELAIDE

Phone (08) 212 7999

NOTE: Prices may vary interstate due to freight costs.

MAIL ORDER:

Local Orders: (03) 543 7877

Interstate Orders: (008) 33 5757

All Inquiries: (03) 543 7877

CORRESPONDENCE:

P.O. Box 620, CLAYTON 3168

Telex: AA 151938

Fax: (03) 543 2648

MAIL ORDER HOTLINE

008 335757

(TOLL FREE)

(STRICTLY ORDERS ONLY)

LOCAL ORDERS & INQUIRIES

(03) 543 7877

POSTAGE RATES:

\$1	\$9.95	\$2.00
\$10	\$24.99	\$3.00
\$25	\$49.99	\$4.00
\$50	\$99.99	\$5.00
\$100	\$199	\$7.50
\$250	\$499	\$10.00
\$500		\$12.50

The above postage rates are for basic postage only. Road Freight, bulky and fragile items will be charged at different rates.

All sales tax exempt orders and wholesale inquiries to:

RITRONICS WHOLESALE,

56 Renner Rd. Clayton.

Ph. (03) 543 2166 (3 lines)

Errors and omissions excepted.

Prices and specifications subject to change

IBM, PC, XT, AT* are registered trademarks of International Business Machines.

*Apple is a registered trademark.

*Denotes registered trademarks of their respective owners.

MasterCard

VISA

a document, the Z88 places whatever you were working on under the List of Suspended Activities. This might sound like the next step should be something like going to jail, but it is really quite a good way of keeping track of things as you go along.

The list shows the date and time for each activity, and the filename of the document or program. To re-enter an activity, you select it from the List of Suspended Activities and carry on as before. This enables fast access between various activities and files, and to make things even more convenient, the clock, alarm, calculator, calendar, file manager and panel default selector are all accessible as more or less instant popdown selections. This means that if you are writing a letter under Pipedream, and you want to look up a diary entry or check the time there is no need to exit Pipedream. All you have to do is press the appropriate control key combination and the diary or clock appears in a separate window.

As well as word processing, Pipedream can be used for spreadsheet and database applications. The manual gives clear instructions on setting up spreadsheet tables, using columns, performing calculations on spreadsheets, sorting and retrieving database information, and how to merge information between applications for writing and printing reports. The diary has search functions for listing engagements, and it can be used in conjunction with the calendar popdown to find any date quickly. Any number of alarms can be set, with a message displayed to tell you the the reason for the alarm. The BBC

Basic programming language is included, with full access to display and database functions, as well the filer utility for managing information between RAM and EPROM modules.

Of the four models, which one gives the best value? It depends really on how much memory you need, and whether you want to keep a permanent record, even if the batteries run out. In terms of dollars per kilobyte (in their basic versions), the Casio gives the best value, and for a simple database for personal uses it has plenty of memory and will not lose it when the batteries need to be changed.

The most convenient model to carry around is the smallest, but the Megalogic has the disadvantage that it will lose its data eventually when the batteries run out. Either the Casio or the Megalogic are quite adequate unless you require more sophistication in terms of setting alarms, manipulating data, word processing and communications with other computers.

The Psion is smaller than the Z88, but it does not have a QWERTY keyboard. In other respects, the Psion and the Z88 are almost equal. They both have an initial resident RAM of 32 Kbyte. Both can be expanded with EPROMS or extra RAM, and both can be configured to talk to other computers via cables and software.

They can both be programmed with their own internal languages, and they can be run from mains power with appropriate adaptors. The Z88 has one big advantage if you plan to use your hand held computer for word processing, in that it has a full sized keyboard. It could be teamed up with a portable printer, such as the Dico-

nix Inkjet, and you could print out your memoirs in the middle of the desert, at the beach or up a mountain. It all depends on what you really want to do with your hand held (apart from carrying it around)□

Product Details

Product: Megalogic PD-8000
From: Australian Greeting Cards, 36 Futura Rd, Noble Pk 3174 Vic.
 (03) 798 6055
Price: \$74.95 taxed

Product Details

Product: Casio SF-4000
Distributor: Mobex, PO Box 61, East Roseville 2069 NSW
 (02) 406 6277
Price: \$279 taxed

Product Details

Product: Psion Organizer II XP
Distributor: Eastern Micro Electronics, 45-47 Tope St, South Melbourne 3205 Vic.
 (03) 699 3088
Price: \$499 taxed Review copy from: RCS Design

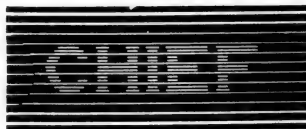
Product Details

Product: Z88
Distributor: Barson Computers, 335 Johnstone St, Abbotsford 3076 Vic.
 (03) 419 3033
Price: \$906 Z88
 \$150 128K RAM module
 \$88 printer cable
 All prices taxed.

An accounting package for only... \$299?

inc.tax

An extremely easy to use, yet powerful accounts receivable and customer tracking package, and it is 101% Australian!



INVOICES:

- On screen entry and editing.
- Instant printing on any stationery.
- Easily formulated to suit any type of stationery.
- Recall invoices.

STATEMENTS:

- Full statement printing.
- Aged accounts with date breakdown in 30, 60 and 90+ days.
- Search on outstanding balance.

IDEAL SYSTEMS Pty. Ltd.

200 Lygon Street, Carlton, 3053
 P.O. Box 172, Carlton South, 3053
 Phone: (03) 663 6276

MAILING LISTS:

- Prints all or specified accounts.
- Labels printed on any format.

CUSTOMER TRACKING:

- Full name, address and phone number.
- Next and last contact date.
- Notepad style storage of information on customers that can be easily read and updated.

... and more!

Dealer and other enquiries welcome!

Parliament House computers

The New Parliament House computer network connects through 12 kms of cable to over 400 terminals. The complete system is expected to be running when the budget session of Parliament begins in August.

Originally the idea was for a smaller system servicing only the Senate. However, now there is a larger network available to all 190 MPs with five areas of the Parliament being linked into the system. The areas on the system are Hansard, the Senate, the House of Representatives, the Joint House Department and the Parliamentary Library. Senator Sibraa, president of the Senate, estimates the contract is worth over \$25 million.

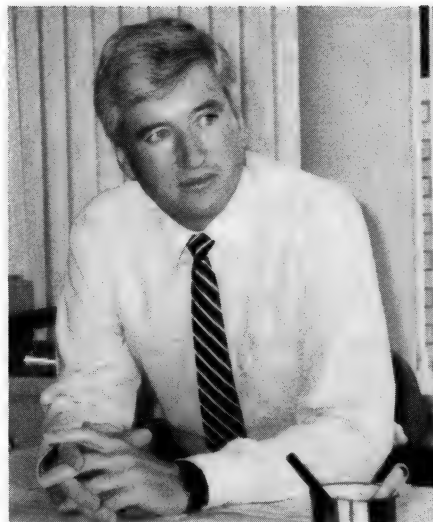
Each MP's suite has a personal terminal for the member's desk, a DECmate for their secretary, another terminal and a printer plus a VAXmate workstation. The terminals are linked via an Ethernet coaxial cable to the VAX mainframes. Impact printers with 300 dots per inch resolution are also in the offices.

The Parliament network extends to 225 electorate offices around Australia.

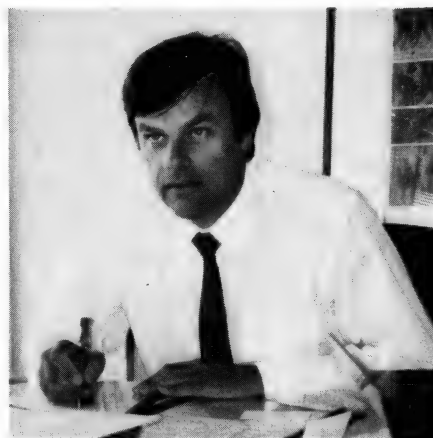
Apart from the standard office features, the system has image processing available. This means graphics, such as photos and diagrams, are stored alongside text. Each MP's system has electronic mail and text retrieval with a natural language request system.

Computer Power, a wholly owned Australian company, is responsible for the project together with sub-contractors Digital, Cleveland, Rank Xerox and Data-bridge.

Computer Power has developed a software package called Status. According to its Special Projects Manager Robert Howdin, Status is an expert system with text relevance. This means it will not only retrieve articles but rank them in order of importance. Howdin says Status will be generally available around August this year. He added that US computer companies are showing a lot of interest in the package. Other features of the Parliamen-



Robert Howdin the Special Projects Manager for Computer Power.



General Manager, Services Division, Computer Power, Howard Powell.

tary system include desktop publishing facilitated with Pagemaker.

The Parliament network extends to 225 electorate offices around Australia. Each MP's electorate office has a Cleveland PC. As well as normal word processing using WordPerfect or WIPS, the PCs will log on to the Parliament House VAX mainframe for document exchanges.

The PCs are IBM AT equivalent with over 55 per cent Australian content. Computer Corporation of Australia (CCA), more well known as Cleveland, assembles them in Brisbane. The chips are CCA's own design, built in Taiwan.

When asked about OS/2, Howdin said that the system will handle it if the parliament wants to go that. He also said that DEC has responded to OS/2 with an Apple Mac interface called Mac-Now. The Apple gives hi-resolution with graphics based functions running through Ethernet to a VAX system. This is another option for the Parliament system if it wants to go that way later.

Howdin, who has an Amiga at home, thought OS/2 was IBM software catching up to the Macintosh and Amiga. However, he also said OS/2 would be the dominant force for a long time to come.

I asked Howdin and Howard Powell the General Manager, Services Division, of Computer Power how MP's might respond to their new system; both said there were some real PC enthusiasts amongst the politicians, however, like all businesses or government departments some will use the system extensively while others will leave it to their staff.

Martin Mullane, a senior clerk with the Senate, said one or two trials were now running with laptops. A Toshiba T1200 laptop was with an overseas delegation at the moment and was proving useful for instant data retrieval. Computer Power may provide laptops if required at a later stage of their five year contract.

The Parliament has yet to decide on public access. At this stage dial-up is not part of the system. However in the public areas of the New Parliament buildings there may be scrolling screens with video-text information. This would include daily agendas, locations and directories.

One section of the Parliament which is yet to have a computer system is the executive wing. This is the Federal Cabinet area including the Prime Minister's office. The contract for this system is being announced shortly. Computer Power's Howdin said the company has also tendered for the executive contract.

Computer Power sees spin-offs leading to similar systems for State Parliaments. Powell said that Computer Power's Brisbane office is dealing with the Queensland Parliament and the Victorians are also showing some interest.

There are plans for a Centre of Computer Excellence at the New Parliament House. The idea is to attract top graduates to the area for specialised data retrieval research. □

Part 2

Business Speciality Software

After researching the Business Speciality Software Catalog for our May issue, Steve Keen is convinced computers have already taken over the world! Here are six of the speciality packages that are pervading every aspect of our life . . .

RESearching this article eliminated my lingering skepticism about the claim that 'computers are taking over the world'. The many things that spreadsheets, databases and word processors cannot do are being done by other, specialised programs. They pervade management, from Computer Integrated Manufacturing at one end to Computer Aided Retailing at the other.

Nor does the innocent individual avoid their influence, simply because you don't work in the relevant industry. There are very few people who don't listen to the radio, don't shop in supermarkets, don't buy from salesmen. As such we are all 'consumers' of vertical market software – it is no accident that two rock music radio stations can sound so different, that soft drink bottles appear at the end of supermarket aisles, and the salesman knows your hobbies and your family's names. They are all using vertical market software.

Apollo

The ancient Greeks used to attribute much of the capriciousness of the universe to the whims of the Gods. It therefore seems strange that Information Resources have chosen to name a product which brings science to the task of parting the consumer from his or her money after one – until you note that Apollo was both rational and the god of prophecy. In 'pop' anthropology, the term Apollonian characterises societies where order and control are paramount. Societies ruled by emotional abandonment, such as computer magazines, are Dionysian.

Apollo (the Total Store option) assists supermarket management to design shop and shelf layouts on screen, and then allocate products to shelves on screen, in a fashion which will ensure the most efficient usage of space, the supermarket's key resource. It does this using either accurately outlined product symbols, or actual photographic quality images of the products.

Once you have set your management priorities for a line of products, and entered your stocks and delivery details, it will assess how your current layout performs on those criteria, and compare this to any proposed layout. Its reports then direct supermarket staff in their shelf stocking, and reports on actual versus expected profitability can indicate where further change is required.

The fact that it runs on PCs at all is a tribute to the programmers, more so than to the machine itself. Running on an old Compaq, the speed of screen writing was nonetheless impressive. A shelf was drawn, and then filled with Prima juice packs, Diet Coke and Pepsi short packs, then cans and finally one litre bottles, to the same scales they occupy on genuine supermarket shelves, and in the same colours. The whole process, for a gondola 3 metres wide, took about 20 seconds (on a 386 machine, that time would drop to 2 seconds).

The 'pretty pictures' option for Apollo – known as Vivid – is not simply cosmetic. As the developers point out, it allows supermarket planners to design attractive shelf layouts quickly onscreen, rather than having to design actual mock shelves and laboriously change layouts by hand. Full colour hard copy can also be given to shelf stockers to control the actual stocking of a supermarket.

Apollo would be run by the State Sales manager for a retailer, or the national product manager for a manufacturer – both individuals who would be familiar with spreadsheets, and who would perhaps have been using spreadsheets to attempt some of the analysis which Apollo provides. Little wonder that Apollo's user interface apes that of 1-2-3, with a top of screen line menu and a one line help prompt for each option.

The similarity with a spreadsheet stops at the command line, however. Apollo is primarily an analytical database, which combines detailed information on store and product dimensions, stocks, prices, historical sales and delivery details to predict the effect of different space allocations on sales and profitability.

Apollo's measurements database contains information on over 40,000 products; any new products for one of our major retailers goes first to Apollo Information Resources for measurement before it appears on the shelves.

The measurements cover the obvious issues of height, width, depth and weight and how many units per pack, plus not so obvious but vital measurements like 'layover' (how 'tall' the product is when it is laid on its side), 'nesting' (two contoured cans on top of each other will less than twice the height of one can) and 'peg hole' (how many plastic packets of the product can fit on the typical 'hat rack' sweet displays). The file also covers the product's barcode number, its stock code, but not its price. This is decided by the retailer itself, and stored in a separate file which Apollo accesses when calculating profitability.

Gondolas

Apollo's basic unit of space is the gondola – both sides of a retail shelf, which the Total Store version aggregates into a profile of an entire supermarket, including aisle layout. Each shelf will store a product category (dishwashing liquid, pet food, and so on), consisting of numerous items from different manufacturers. The important questions for the retailer are which products to stock, and how much space each should take up.

The answer depends on the store's objectives for that gondola – it may be mainly used to entice customers into the store, rather than strict profitability, for example – and a complex mass of information about each product, including its bulk, cost price, his-

torical sales, how it is delivered, the time between deliveries, its warehousing costs, and so on. To compute an answer from this mass of data and host of competing objectives, involves sophisticated optimising routines, which are the rational heart of Apollo.

Products will rank differently depending on whether you are allocating space so as to minimise purchase costs, maximise unit turnover or sales, profit or gross margin, whatever. The retailer first ranks a large number of potential criteria on a scale from 0 to 9 (with 9 being the most important), and Apollo will then provide a corresponding ranking of all the products in that section. You can have Apollo treat these constraints as minimum, maximums, or performance optimums, or a combination of all three. Apollo's speed on this 'rational' task is comparable to its pace with graphics. It also took only about 10 seconds to produce a text report ranking a group of 10 products on complex retailing criteria.

Direct Product Profitability

One of the key measures used by retailers is Direct Product Profitability (DPP). This measures the entire cost of a product, including purchase price, the net days of credit from the vendor, number of cases on incoming pallet, how the product is received by the warehouse (small truck or container, say), the replenishment method, how the store unloads, and the store pricing method. Some high profile products, which used to dominate their section of supermarkets, actually had negative DPPs on traditional space allocations because their space requirements and visibility load were so high. Apollo showed that supermarkets could increase overall profitability by reducing the space allocated to these products.

Apollo's output, apart from the glossy reproductions of shelf layouts, include shelf fact sheets, ranking reports showing the retailer's criteria and how products rate competitively against them, space utilisation reports showing linear square and cubic space usage against available space, and section comparisons which show how one proposed layout compares to another on the chosen criteria. While the behaviour of customers in the aisles may still be Dionysian, it's clear that their buying impulses are being channelled by the rational Apollo.

Though Apollo's direct audience is the supermarkets, it is also increasingly being used by manufacturers, so that they can negotiate with supermarkets on the basis of the expected profitability of retailing their products. Even so, the market is still tiny in numeric terms. Most supermarket chains would buy one copy, perhaps two, per state. Each supermarket would then be designed at the state level, not at the store; results would then be collated and compared at the state level. Manufacturers would normally buy only one copy for the whole nation, and consider only different shelf layouts for their products and their direct competitors.

Given this tiny market and the powers Apollo offers, its price of approximately \$30,000 seems a bargain. Certainly the fact that it runs on a PC is part of the reason for this low price; the same software on a mainframe would cost perhaps ten times as much. If you'd like to know more about the Apollo Space Management System, contact Information Resources on (02) 982 4388 or (03) 890 2311.

Foresight

Prior to the stockmarket crash last October, it was possible to get finance for takeovers and expansions on the basis of highly optimistic forecasts of future profits. Now all players in the corporate casino are much more critical of the financial viability of firms. Foresight enables banks, accountants and companies dis-

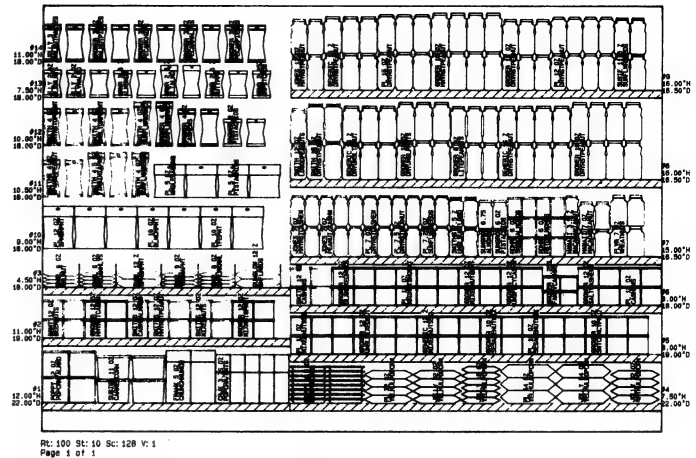


Figure 1. Once the retailer has decided on the objective for a gondola (set of shelves), Apollo uses optimising routines that draw information from a database of over 40,000 products to determine the shelf layout that maximises profitability.

Section 1: YOUR STORE GROCERY STORE #1 #10 CURRENT SCHEMATIC - Version A Length 10', Height 6' 11"				Section 2: YOUR STORE GROCERY STORE #1 #10 PROPOSED SCHEMATIC - Version B Length 10', Height 6' 11"			
SECTION	SALES DOLLARS	PROFIT DOLLARS	INVENTORY DOLLARS	CUBIC FEET	SALES/ CUB FT	PROFIT/ CUB FT	INVENTORY/ CUB FT
CURRENT SCHEMATIC							
SNACK NUTS - JAR	328.19	218.59	441.32	34.67	9.47	6.07	12.73
SNACK NUTS - TIN	428.01	397.00	64.32	24.16	17.39	16.44	2.66
SNACK NUTS - REBOARD	72.22	69.08	57.57	22.81	3.28	3.14	2.62
SNACK NUTS - POUCH	15.00	12.36	32.16	3.31	4.53	3.73	9.71
SNACKS - MISC	38.21	21.59	73.94	8.51	4.49	2.54	8.69
Total:	873.63	718.62	669.31	92.66	9.43	7.67	7.22
PROPOSED SCHEMATIC							
SNACK NUTS - JAR	338.39	228.69	427.61	32.57	10.38	6.78	13.13
SNACK NUTS - TIN	451.71	399.34	45.81	24.49	18.44	16.31	1.87
SNACK NUTS - REBOARD	78.41	75.64	43.21	22.19	3.53	3.68	1.95
SNACK NUTS - POUCH	19.91	16.86	25.92	2.13	9.35	7.92	12.17
SNACKS - MISC	42.71	22.19	53.12	7.29	5.86	3.84	6.72
Total:	931.13	738.92	595.67	88.67	10.50	8.33	7.29
NET CHANGE:							
SNACK NUTS - JAR	10.20	10.10	-13.71	-2.10	0.91	0.71	0.40
SNACK NUTS - TIN	31.70	2.34	-18.51	0.33	1.05	-0.13	-0.79
SNACK NUTS - REBOARD	6.19	10.76	-14.36	0.18	0.25	0.46	-0.67
SNACK NUTS - POUCH	4.91	4.50	-6.24	-1.18	4.82	4.19	2.46
SNACKS - MISC	4.50	0.60	-20.82	-1.22	1.37	0.50	-1.40
Total:	57.50	28.30	-73.64	-3.99	1.07	0.66	-0.50

Figure 2. A Section Comparison Report produced by the Apollo Space Management System - this example compare a current shelf layout with a proposed one; it indicates that by adjusting stocking levels, total sales for the section can be increased while inventory is reduced.

cern whether a company is headed for boom or bankruptcy on the basis of data contained in the readily available corporate balance sheet. It can also evaluate whether a proposed budget will direct the corporate ship towards solvency or the rocks.

The user interface is what I expected would be typical of vertical market programs (in fact I found that most were quite sophisticated): a simple menu system with prompted entry of data and rigid reports. Little programming effort has gone into the surface glamour; however there is a great deal of power beneath the cosmetically bland surface.

The heart of Foresight is a statistical database storing the financial profiles of healthy and failed companies in a range of different businesses: Manufacturing, Services, Trading, Construction, Finance, and Diversified. The profile covers the range from simple measures such as the ratio of debt to equity, to more complex measures comparing the value of inventories and work in progress to sales. As you enter data for your selected company, these indices are constructed and compared to the industry averages.

When all the information is in, the several indices are pooled to

yield an overall measure of the company's financial status; this can range from 'Strong' to 'Distressed'. Finally, the program provides a verbal commentary on the company's standing on each index, and what action this suggests should be taken, makes an overall assessment of the company's prospects, and gives general management recommendations – which can include overhauling the management itself.

The data Foresight uses is readily found in corporate balance sheets. The major categories are Current Assets and Liabilities, Quick Assets and Liabilities, and Retained Profits: about 20 figures are requested in all. Foresight will make judgments on the basis of only one year's figures, but up to five years data can be entered, in which case Foresight also comments on trends.

Foresight has a significant user base in Australia and New Zealand, and is now being marketed in Europe. It is used by banks to assess loan applications, by financial advisers, and by corporations themselves to assess their financial position and provide management advice.

Its reports come in three forms: a rudimentary 'risk graph'; an index of overall financial risk and seven distinct risk indices; and the company commentary. Most analysts could calculate each of the separate indices themselves; the difficulty comes in deciding what to do when the indices give conflicting judgments on the firm. Foresight provides a means to interpret.

The algorithms behind Foresight evolved from the statistical technique called multivariate discriminant analysis. The financial ratios for a large number of successful and failed companies were analysed, and a weighting formula was derived which could predict whether a firm was likely to fail or succeed on the basis of its indices.

Risk rating

The Australian developer of Foresight, Dr. Mervyn Lincoln, extended this international research with a flexible number of indices, risk research for five classes of business which included private (companies not listed on the Stock Exchange) as well as public companies, and the ability to deduce an overall risk rating, expressed as a number between 0.00 (safe) and 1.00 (very distressed), rather than the simple judgment that a company would

or would not fail. The numeric rating is supplemented by a commentary, on each index and on the company's overall position.

The rating itself results from a comparison of the overlap between the indices for the company being analysed and the indices for the failed and successful companies used to construct Foresight's knowledge database. A high degree of overlap with the scores for failed companies results in a high (risky) score, while a high degree of overlap with the scores for successful companies results in a low score.

Trends in a company's risk position over time are also analysed: obviously a medium risk firm which was previously low risk is in quite a different position to a medium risk firm which was previously high risk.

Foresight's documentation includes some fascinating data on industry risk, up to and including 1985. Media companies rated as strong throughout, with risk ratios never exceeding 0.05. Clearly that situation will be different now, after the changes to the Government's media ownership rules which inspired such risky ventures as the Bond takeover of Channel 9 and the privatisation of Fairfax. Transport was in general high risk, as were most divisions of manufacturing except household goods, chemicals and paper. These profiles should change as the effects of the stock-market crash wash through the Australian and world financial systems. To learn more about Foresight, contact Scientia-Whitehorse on (02) 436 0644.

Map Magic

As any well-read person knows, Arthur Dent (and subsequently the planet Earth) was the victim of town (and subsequently universe) planning in Douglas Adams' *Hitch Hiker's Guide to the Galaxy*. Earth had been zoned for demolition to make way for a new bypass; Dent found the plans the week before the bulldozer arrived, in the basement of the local council, down a dangerous stairwell, in an unlit room, inside a filing cabinet marked 'Beware of the Leopard'. It was, by then, too late to protest (effectively, anyway).

Map Magic may overcome such problems, at least on this planet. It is a specialised CAD package for geography, which can show at an instant whose properties will be affected by a proposed road, which development applications are pending for a region, where sewerage and electric cables are stored, which areas could be affected by flood, which houses fall within the danger zone for a chemical factory, and so on. Developed in the last two years by a company with 18 years experience in the surveying and civil engineering areas, it is gradually being introduced by local councils in Australia and New Zealand.

The firm entered into the CAD market some years ago, but found the market saturated, and decided to focus on the niche it knew best: maps. Map Magic was released for H-P machines in mid 1987, and it is currently being rewritten in C for release on Unix machines by mid 1988; a beta version was demonstrated at the Surveyors Conference in April. It is much the same as its H-P-Basic counterpart, but runs about ten times as fast on comparable hardware, is multi-user, and stores much more data. It will have different levels of security for different users, making it possible for one system to handle surveying, town planning, rates management and enquiries from the public.

Much of the information stored by Map Magic is entered by digitiser or scanner, or using built in co-ordinate geometry features. The digitiser is the most popular method, along with importing information from an existing database.

PTY 1.0					
*** F O R E S I G H T ***					
SAMPLE COY PTY LTD					
	1982	1983	1984	1985	1986
CFBCL		0.17	0.23	0.10	0.16
Unsatisfactory					
Cash Flow Before Tax To Current Liabilities					
The margin of safety to meet short-term commitments from cash flow needs improving. This can be achieved by :-					
a) earning a higher level of profits,					
b) substituting some short-term debt with long-term debt or equity.					
c) reducing investment in assets and using the funds to reduce short-term debt.					
The current value of your CFBCL is 0.16					
The management should target to increase the value of CFBCL to at least 0.25					
F1 For Help. Press any key for more details ESC to Exit.					

Figure 3. Foresight's simple menu system overlays a statistical database storing the financial profiles of healthy and failed companies in a range of different businesses. The profile covers simple measures such as the ratio of debt to equity, to more complex measures comparing the value of inventories and work in progress to sales.

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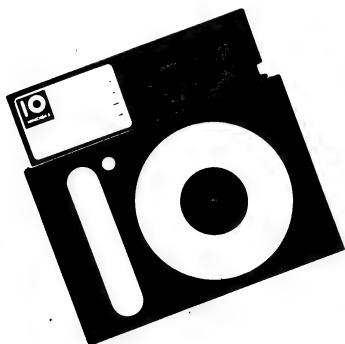
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--	-------

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Figure 4. The basic unit in Map Magic is the lot. A point which is wholly within one lot, called the 'Geocode', is used as the indexed link between the relational databases holding detailed information on lot boundaries, houses, utilities, kerb lines and so on, and Map Magic's screen representation of the land.

There are a multitude of details to any map: land topography, trees and streams, housing and commercial lots, roads, sewerage pipes, electric and telephone cables, rights of way, houses, offices and factories, owners of land, residents. Each class of information is stored in a different map 'layer', with the information on each layer being stored in a relational database. Typical layers include lot boundaries, coastline, road names, street numbers, houses, sewer mains, water mains, water connections, footpaths, and kerb lines. It would also be possible to store market research, census or election result data and use Map Magic to display the geographic variation in, say, incomes, using a query in SQL or DBMAGIC.

The basic unit in Map Magic is the lot, which is used to describe both actual house and commercial lots and roads. A point which is wholly within one lot, called the 'Geocode', is used as the indexed link between the numerous databases and Map Magic's screen representation of the land.

User interfaces

The program presents four kinds of user interface: the major, graphics mode where the actual map layout is shown, data such as lot shapes, roads and so on, are entered, and where graphical queries can be made about lots and lines; the data dictionary where symbols (for trees, for example) are defined and edited; a data entry mode where textual information (owners of particular lots, number of occupants of a house, and so on) is entered; and an SQL module which lets you enquire of the program's many databases and a DBMAGIC interface with the same function as SQL.

The main graphics mode presents a window into a map which can be many times the screen area. As you move your mouse or digitiser driven pointer about the screen, the current co-ordinates are shown, replaced with the message 'Redraw Left' when you move past the left boundary of the window. Function keys present 32 commands, covering everything from graphics entry to query using graphics and surveying functions, such as working out the angle between two points, or the relative elevation of two points.

The benefits of Map Magic to the user become evident when you consider the manual processes it replaces. The manual method of letting home owners know that their houses are affected by a proposed road is to first get the relevant cadastral maps (an inventory of land parcels), then draft where the road will go on each of them. The cadastral map shows deposit and plan numbers and lot numbers. You would then search individual Deposit and Plan files to find the title numbers, from which you can search the individual titles to find the owners.

With Map Magic, you draft the road on screen as a line, and then use a line enquiry to find which houses are within 20 metres of the line, and who owns them.

This relational database technique also avoids data duplication, and centralises information. If a subdivision is created, all the relevant files are updated. In a multi-user setting, surveyors and town planners can use it for design, enquiry clerks can use it for public information, accountants for fees, all with different access levels.

You can also alter the amount of information shown on screen to suit different users: there is no need to show the sewerage layer when a new flight path is being considered. Contour maps can be overlaid, a grid cell map can be created with different colours representing different characteristics (for example, displaying the distribution of school age children).

The SQL or DBMAGIC modes are akin to making requests in dBase. You type in information you want and the conditions on it; Map Magic then searches its databases and finds the Geocodes which match the required information. You can then print textual information to the screen or a file, or return to the graphics mode and highlight the selected lots of land.

After the enquiry, the relevant lots are then highlighted by Map Magic, making it easy to see what the impact of rezoning could be. Map Magic can store and recall past searches, allowing you to execute them from a menu, or edit them, even combine several searches into one.

Map Magic's main market is local government and public authorities, though it is easy to envisage ways that it could be used by, say, commercial interests and statisticians. Fire brigades, utilities, the Police Rescue Squad, town planners, and newspaper deliverers have expressed interest. It could be used by the Bureau of Statistics for census data, by marketing firms to overlay of sales data, by airlines mapping flight paths. OTC uses it to map its satellite dishes and to adjust dishes for communications.

The basic single user version costs \$14,000, while a full blown Unix version incorporating an existing database (known as Landlord) costs up to \$39,000. Kingdom recommend a H-P 319 or 330 for a small system, and the H-P 825 for larger ones. Negotiations are continuing with Apollo and Sun to port it to their Unix boxes, and a Xenix launch can't be too far away.

Unfortunately, it has come too late to save Arthur Dent, but if you'd like to know more about Map Magic, call Kingdom Pty Ltd on (02) 807 4822.

Music Selector

The two Sydney radio stations 2DAY-FM and 2MMM-FM both play rock music; the same songs appear on the two stations (though with varying frequencies); yet it normally takes no more than 3 consecutive songs before the average listener passes the 'blindfold test' and can identify which station is playing. One station sounds 'mellow', the other 'up front'.

The difference is not just because one has a mellow music director, and the other a rager. The sound characteristics they want

their stations to project have been entered into Selector, a American music selection package marketed by PSI Computer Systems, which is used by in excess of 50 per cent of commercial radio stations.

Selector, like Apollo (and to some extent Foresight), consists essentially of a database and a sophisticated optimisation routine.

The database in Selector's case describes each song in the station's library by a multitude of criteria. These include the song's mood, tempo and timbre, its category (recent hit, high rotation, golden oldie), theme, country of origin (useful in ensuring that the station meets the Broadcasting Tribunal's Australian Content rules), its beginning and ending beat. Also stored are the song's author and comments on each song, which can guide the DJ's patter between the songs.

The program also holds a history of the last 29 days music, which it uses to govern the selection criteria entered by the station's music director. This human input designs the 'sound' that the station wishes to have, and consists of global rules and the musical layout of each hour.

Global rules

The global rules include the minimum separation rule, which specifies the minimum amount of time that can elapse between replays of a song (a Top 40 station would have a lower minimum separation for its current hits category than one specialising in nostalgia), and recurrence, which sets the maximum length of time between plays of popular songs.

The hourly layout of a station's music is a log specifying what

category of song should be played at each interval within the hour, and it covers not just the song's mood, category, timbre and so on, but also how one song should run into another – which avoids running a Glen Campbell number immediately after a Led Zeppelin one (unless the closing mood of the former matches the opening mood of the latter, as with 'Stairway to Heaven' and almost any Glen Campbell piece).

You can also determine that if a song is played at 8-8:30 am, it can't be played at 5:30-6 pm, to avoid people hearing the same song while driving to and from work. The program can also be overruled for special days, such as Christmas, and Australia Day.

This level of programming sets an overall policy for the station. It is also possible to use theme and author information to set up more 'spontaneous' programs – for example, a heavy bias towards John Lennon's music on the anniversary of his death, or music about lousy weather for wet spells.

As with Apollo, each rule within the selection criteria is rated in order of importance, since it is impossible to satisfy all policies simultaneously. When Selector is told to generate a music log, it starts with the category of music specified for a particular time slot. If, for example, the first song after the 9 am news is programmed to be a 'golden oldie' from a particular artist, Selector looks through the golden oldie category, looking for a song which obeys all the other rules about minimum separation and so on. If the first song doesn't meet the criteria, it throws it out and moves on to the next. After multiple iterations, Selector produces a log of proposed songs.

This will almost certainly include some gaps, where it couldn't find a song to suit the criteria, in which case the musical director

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must make a selection from a pop-up window. The Selector log can also be edited at will, regardless of the music policy rules, should that be desired.

Selector has enjoyed a fairly enthusiastic reception from the music broadcasting industry, replacing a job which used to involve an encyclopaedic memory and a great deal of manual slogging with one focused on policy. It also makes it much easier for a station to respond to events of the day in selecting its music, and applies a systematic approach to the entire record collection that no human could hope to match.

Selector has a commercial counterpart, Metro, which controls the scheduling of commercials.

There are three essential steps in getting the money and commercials into commercial radio: designing a skeleton of programs and advertising breaks; entering contracts where advertisers book for air time; creating and editing a traffic log that DJs finally put to air, surrounded by music (see above) and patter.

The skeleton defines a structure of programs and breaks on an hourly range over 24 hours of broadcasting.

Each program is described on an hour by hour basis, with a beginning and ending time and date, a source, and type of program. Each hour will have a different number of ad breaks, and each break consists of a potentially different number of commercials, or spots. These two aspects, breaks and programs, give you a skeleton log. (Until recently the maximum advertising time per hour was set by the Broadcasting Tribunal; now this has been deregulated and left to the stations and the market to set. You may have noticed that ad breaks on TV are now longer than the regulated 2 minutes; radio has not necessarily increased the proportion of ads, since the radio market is much more volatile, with listeners tuning into 4 or 5 stations in the course of a day.)

Once the skeleton is set, contract booking can begin. Radio is a much more targetted advertising medium than TV, where several target market segments would watch the one program. Consequently radio stations use survey information and combine that with prospect profile data, to show which program targets a desired advertising market better. This in turn influences contract setting, where advertisers specify in which program types they wish to have their ads broadcast.

Most radio packages are booked for 30 spot runs, at the station's discretion, across a broad range of times to suit the advertiser's target audience. The advertising rate is charged on a per spot basis, with a different price set for each program – it costs more for the breakfast slot than the midday, for example. Advertisers also pay for a priority ranging from 0, where the ad must be placed in the designated timeslot, to 20, where place-

ment is entirely at the station's discretion. A ranking of 15 and above is usually used for community service announcements.

The main desire of advertisers is to be placed first in breaks, but with several advertisers vying for the same position, the available times must be shared between them. This is the function of Metro's optimiser, which combines the programs, breaks, spots and advertisers' contracts to produce a advertising log. As with Selector, there will occasionally be spots which can't be filled by the program since too many of its criteria are not met, and pop-up windows are used to show unused spots and unplaced ads.

The combination of Selector and Metro (and their few competitors) now rules the airwaves. So even when you are idly listening to the radio, more than likely a computer has programmed your idleness. If you'd like to know more about Selector, contact PSI Computer Systems on (02) 887 4144.

SAMM

Most of my awareness of the tribulations of selling has come as a customer. My 'favourite' experience concerned a salesman from whose company I had purchased an excellent laser printer, as well as influencing several others to buy the same machine. Every time I rang, he would start with 'Steve, ... Your name is familiar ...'. That salesman's lousy memory eventually cost him his job; what he cost the company in lost sales can only be guessed at.

Experiences from the other side have been equally salutary. I once assisted a dealer at a computer show, at which we generated well over 200 enquiries. The names were never followed up, and a large number of potential sales went stillborn.

SAMM is intended to overcome the above and many other problems which afflict the 'front door' of almost every business, sales and marketing. It was designed by an accountant with a penchant for marketing, Clive Rainbow, who was convinced that the computer power which was normally devoted to accounting, while worthwhile, was akin to shutting the gate after the 'horse' had bolted – the horse being prospective sales. Accounting software told you how you had done; he wanted software to support and enhance the traditionally seat of the pants areas of sales and marketing.

After initially attempting to write such a program in a NEC minicomputer language Smart, and then dBase, he stumbled upon an Australian written 4GL, Meta4. SAMM, the eventual package, was jointly developed by Clive and Meta4's author, John Alexander, from Clive's specifications for the 'perfect' sales management system.

There are now several hundred SAMM users, ranging from relatively small businesses to companies like Australian Airlines, the NRMA, and Price Waterhouse. Rainbow's company Computer Brokers found that most of their customers had already attempted to develop their own packages. Sinclair Knight and Partners had commissioned an application in dBase III+, which worked but was too slow in practice. It was scrapped for SAMM, running on a 3COM network.

SAMM is almost entirely menu driven, with the sole exception being a freeform search command that allows you to select customers and the like using multiple search criteria. The menus in SAMM are designed to 'cascade' from one activity – such as entering details for a new customer – to the next logical step – such as entering the relevant salesman for that customer. Moving on to the next option is thus normally a matter of simply pressing return to select the default menu. At any time you can back up through issued commands by pressing F2, or return to the main

SELECTOR Schedule for 7/4 at 9P									
SB	CART	CLP	TITLE	ARTIST	ACTION	RL	OT	SC	TIG
1.	*1911-	A10	CRAZY	ICEHOUSE	MV01FS	25			
2.	742-	F10	SISTER GOLDEN HAIR *	AMERICA	MV01FS C	33			
3.	1915-	B10	WILD HORSES *	GINO VANNELLI	MV01FS	13			
4.	*2020-	C10	LOOK SO FINE FEEL SO LOU	PAUL KELLY	MV 01A	24			
5.	1956-	D10	BODY AND SOUL	JENNY MORRIS	FV 01A	24			
6.	210-	H10	BROWN SUGAR *	ROLLING STONES	MV01FS	45H			
7.	* 899-	I10	LONG RUN *	EAGLES	MV01FS	32F			
8.	1914-	B10	CATERINA	PETER BLAKELY	MV 02A	22			
9.	386-	G10	CURRENT STAND *	KIDS IN THE KITCHEN	MV01FS	22			
10.	*1765-	C10	FIRST WE TAKE MANHATTAN	JENNIFER WARREN	FV 01B	23			
11.	1889-	A10	STILL HAVEN'T FOUND *	U2	MV01FS	24			
12.	725-	I10	UNCONDITIONAL LOVE *	DONNA SUMMER	FV01FS B	23			
13.	*	-	-	-	-	-			
14.	-	-	-	-	-	-			
15.	-	-	-	-	-	-			
16.	-	-	-	-	-	-			
17.	-	-	-	-	-	-			
18.	-	-	-	-	-	-			
19.	-	-	-	-	-	-			
20.	-	-	-	-	-	-			

Dayparted Daypart Rotation 5 5322 Hour Rotation 2 3173 Total Time 54:54
Closest Play TODAY AT 1P ARTIST Last TODAY IF 2 Next TODAY 11P 9

Figure 5. A music broadcast schedule prepared with Selector.

menu through F9. While its cosmetics are limited, running it is very straightforward, and the program makes several attempts to shield the user from DOS.

In function, SAMM has tried to match the flexibility of sales staff themselves: each salesperson will have different ideas about how information on sales prospects should be stored and retrieved. SAMM is therefore totally parameter driven: the information which the program will store about customers, and the ways they are classified, are defined by the user. SAMM then stores these definitions of database files and fields, and the report definitions, in Meta5's data dictionary (Meta5, the successor to Meta4, is included in SAMM's standard 'off the shelf' price of \$2700).

Computer Brokers almost invariably customise SAMM for each user. There are currently over 50 'standard' versions for different industries ranging from instant printing to insurance and finance, with each version normally further customised for the individual purchaser.

Disaggregated storage

The dominant concept in database software today is the relational database, and the key idea in relational databases is to break your information down into the smallest units possible. SAMM follows this concept to allow highly disaggregated storage of information about customers and potential customers, which allows you to query your customer information from almost every conceivable angle. You can find customers by industry, suburb or street name, source of the lead, likelihood of a sale, hobbies... the actual criteria are limitless, and user defined.

This also overcomes some of the standard deficiencies of more rigid databases. For example, several programs limit you to one contact per company, or one or two telephone numbers for a contact. There is no limit to either in SAMM, because company details are stored in one file, contacts in another, and telephones in a third. Clients can be classified in numerous industries, with industry information being stored in yet another file. SAMM makes heavy use of codes (ranging from 2 to 8 letters) to tie all this information together, but whenever a code is requested, the full English meaning of the code is also displayed on screen.

Most of SAMM is dedicated to dissecting and tracking your potential customers, from any angle desired. The salesman can 'jog his memory' when a prospect rings up by searching on the customer's name, and then quickly show that contact's company and past sales history; a suburb or even street can be selected for a letter drop, to be followed up by a visit; all contacts in a particular industry can be targetted; and a follow-up diary can be used to actually fulfill promises to 'be in touch'.

SAMM includes a word processor for the design of form letters for direct mailing purposes, using SAMM's customer database. Letter recipients can be selected either using the menu system, or using SAMM's query language.

General ledger, debtors and job costing are all built in to SAMM. An entry which is initially defined as a query only can be converted into an order, and an invoice generated along with a courier docket.

From the management perspective, it facilitates detailed sales analysis showing profit from each line, operator, salesman, on a daily basis if required. A sales history can be maintained, including details of when ordered products should be completed. It can hold details of back, forward and lost orders. It assists quoting and enables stock purchasing to be based on quotes that are in the pipeline (along with their probability of turning into actual sales), rather than the usual of being based on confirmed orders.

```

* SALES AND MARKETING MANAGEMENT * DISPLAY MM
[DAY] Today's Date..... 16/04/1988
[CON] Licenced Owner :... COMPUTER BROKERS OF AUSTRALIA. LICENCE# C1000
    
```

* Next Menu *

- [1] CLIENTS AND PROSPECTS
- [2] CLASSIFICATION TABLES
- [3] ENQUIRIES MENU
- [4] FAST DATA INPUT
- [5] ACTIVITY ENTRY
- [6] REPORTS - LETTERS - LABELS
- [7] UTILITIES MENU
- [8] EXIT FROM SAMM

[F1 = Help F2 = GoBack/Cancel F9 = Main Menu]

Choose one of the above [codes] to go on..[_]

Figure 6. SAMM (Sales and Marketing Management) is almost entirely menu driven. The menus are designed to 'cascade' from one activity – such as entering details for a new customer – to the next logical step – such as entering the relevant salesman for that customer.

```

* CLIENT/PROSPECT DETAILS * DISPLAY APR
[PCB] Prospect Code..... SOL6SYDN
[IDC] Individual/Company (DEFAULT:C)..... C (Company)
[NAM] *Prospect Corporate Name..... Solution 6
[SHN] SHN - (Prime Salesperson Code)..... FB
[PHA] Ph Area. Code (DEFAULT:02)..... 02
[PHO] *Phone Number..... 295333
[EDT] Date Entered (DD/MM/19xx)..... 25/08/1986
[TY1] Status. Code..... CUST
[TY2] Sales Ind. [Indicator]..... C
[TY3] Potential. Business..... MED
[FLG] Standard Letter 'Flag'..... EX
[ORI] Origin of Lead Code..... EX
[ORC] Comment on Current Status :..... Computerised Accounting and Busi
ss Systems
    
```

* Next Menu *

- [1] Name and Address Menu
- [2] Classification Codes Menu
- [3] Sales Enquiries
- [4] Follow Up Dates Menu

[F1 = Help F2 = GoBack/Cancel F9 = Main Menu]

Choose one of the above [codes] to go on..[_]

Figure 7. SAMM follows the relational database concept of breaking information down into the smallest units possible. This allows highly disaggregated storage of information about customers and potential customers, which allows them to be found by industry, suburb or street name, source of the lead, likelihood of a sale, hobbies, whatever – the actual criteria are limitless, and user defined.

There is also post promotional analysis for marketing departments, which quantifies leads from different marketing techniques, works out the ratio of enquiries of actual sales, and the profit generated, helping to decide whether the particular marketing avenue was worth the expense.

Hopefully my ex-printer salesman has finally turned to a computer to overcome his deficient memory. If you would like to know more about SAMM, contact Computer Brokers on (02) 977 8600 or (03) 781 4011.

Soft-Tech

The Soft-Tech aluminium joinery job costing system has won its New Zealand developers several software awards, and when you see the package, it is little wonder. Its labour saving and quality enhancing powers are contained within a high quality user interface.

Soft-Tech's main purpose is to provide cost estimates for manufacturers of aluminium and wooden doors and windows. When you think about it, that is an enormous market, encompassing every building in the country above the level of a tent. As well as providing a price estimate, it produces a sketch of the finished product – which can confirm whether the supplier understood

Shopfitters of Australia Limited		QUOTE No. 00007	
SHOFFITTERS OF AUSTRALIA LTD		ENGINEERING UNLIMITED	
P O BOX 125		Site Address:	
BRUNSWICK		12th FLOOR	
VIC. 3056		162 QUEEN STREET	
387 0605		655-6688	
*** This quote is valid for ninety days ***		Page 1	
HALVEYS TOWERS		Monday 14 April 1986	
ITEM: DESCRIPTION	QTY: PRICE	TOTAL	
1 : 400 SERIES RECEPTION ENTRY	1 :	4216.47	4216.47
Color Glass Liner			
021 N No Glass 980-000			
Trim Size Frame Type			
2500x5000			
Hor dim: 1750, 750, 750, 1750 Ver dim: 1000, 1300			
2 : 400 SERIES VIC. & ASS. MANAGERS OFFICES	2 :	888.09	1776.18
Color Glass Liner			
021 N No Glass 980-000			
Trim Size Frame Type			
2500x3900			
Hor dim: 900, 1350, 1350, 300 Ver dim: 2100, 650			
3 : SUNDRIES, GLASS etc	1 :	3368.35	3368.35
	Discount	599.27	
	Total		8761.73

Figure 8. Soft-Tech generates a detailed written quote for the customer, which includes a sketch of the product, plus cutting details for the factory, which includes the same sketch and details of all ancillary parts required.

what the user requested – and cutting and assembly details for the factory floor. Compared to the 'old' days of verbal design, hand sketches and approximate instructions to the factory, the end result is likely to be a product which fits first time, and which gives the supplier a predictable level of profit.

Soft-Tech was initially written for the Wang PC, since addressing graphics was much easier on the Wang than on the IBM PC. IBM's graphics deficiencies have largely been overcome by software development and the developers are now doing an IBM PS2 version with improved graphics and colour, which should be available by the time you read this.

The program could almost stand beside a Macintosh application without shame. It is menu driven, with its menus 'popping down' from the top of the screen. As the measurements for a window or door are entered into the program, a sketch of the window is built up, step by step. If a window design has been recalled, a sketch of it is at all times displayed on screen, resizing itself when menus alter or overlay each other. A sketch is also provided on each user-definable printed report, and again the sketch is dynamically resized to suit the report.

In practice, Soft-Tech replaces a complicated, time consuming and error prone manual process with a simple and accurate automated one. There is no such thing as a standard door or window: they differ not just in size and shape but in the width, strength and type of surrounding materials and their exposure to the elements. Pre Soft-Tech, designing a fitting for your unique hole in the wall involved you nominating your style preferences from the company's catalogue, a salesman calling out, taking measurements, making a rough sketch and a rough estimate of costs. Cost depends upon labour, materials and finishes, and the number of variations in aluminium extrusion types and finishes alone is stunning – 200 metal types, with 25 finishes for each type – with each type and each finish having a different cost.

The likelihood of the salesman getting the measurements, materials and costs right first time was nil. The probability of errors was compounded by the next stage, of specifying the metal and glass cutting details to the factory.

Soft-Tech has streamlined the process from beginning to end. A number of standard window and door types are supplied with the package, and purchasers can design their own additional ones, which they would normally put into a catalog.

Soft-Tech has eliminated house calls; nowadays the measure-

ments are supplied by the customer over the phone. As the measurements are specified and entered into Soft-Tech, the program draws a representation of the window or door on screen. Suitable metal types and alternative finishes are displayed on pop-up windows, from which they are selected by positioning the cursor (or directly entering co-ordinates) and pressing return. If you want to try a variation, the program can 'locally' or globally replace one type or finish with another, and provide an instant calculation of the alternative cost.

Each new element of a window is costed as it is entered, using a database of current costs. It is also possible to overrule the database's cost and enter your own, or offer a discount to particular customers, working from a client file. Once the quote is finished, the supplier has a immediate statement of materials, costs and margins.

While this is not a CAD package, and the diagrams are simple 'stick' representations, the database behind Soft-Tech definitely has CAD features. For example, if a window exceeds a size which can be affected by wind, extra reinforcement is automatically included.

There are also some 2D and 3D modelling features built in. One dimension can be altered and all other changed to maintain the initial shape, where required. Soft-Tech can do 3D windows using trigonometry to design the shapes, which allows it to be used for complicated designs such as greenhouses. It will do non-90 degree frames (raking frames) with ease, and triangles, octagons and so on can be done designed using co-ordinate geometry. The factory cutting information includes the mitres needed for any 3 dimensional joints.

Instant quotes

Once all the data is in, the program provides an instant quote, based on current prices and production costs. Should these change between quoting and actually delivering, the program automatically incorporates the changes.

Soft-Tech uses the quote information to generate a detailed written quote for the customer, including a sketch of the product, plus cutting details for the factory which includes the same sketch and details of all ancillary parts required – screws, types of glass, rubber fittings, and so on. If there are several windows or doors in the one quote, the factory report can show either cutting details for each window separately, or total requirements of each type of metal and glass for the entire quote.

A management report shows the itemised cost, plus margin, with the breakdown covering costs for individual metals, glass types, labour time in minutes and wage cost. These details can be used to plan staff needs and direct stock purchases, though the program itself does not yet feature stock control.

The program is normally sold with a Wang PC, in which case its price is \$13,500. Sold separately it costs \$15,000. It is regularly updated, with a maintenance fee of 1 per cent per month of current list price. To find out more about the Soft-Tech Joinery System, call the Office Resource Centre on (02) 29 7704.

Conclusion

The above six products are only a small selection of the many in last month's listing, which itself probably showed only the tip of the iceberg of such applications. Multiply them across the many industries in our economy and you get a picture of how crucial the microcomputer has become to the management of western civilisation. I now subscribe to the apocalyptic statement that there will be two sorts of businesses in the 1990s – the computer literate, and the bankrupt. □

HELP



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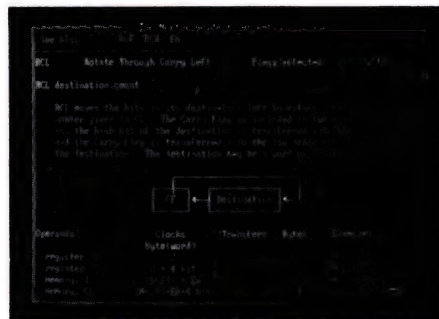
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ZIM

FOR DATABASE POWER!

IN AUGUST, *Your Computer* will feature databases, including an evaluation of the long awaited dBase IV. It will need to be a significant improvement over its predecessor to hang on to its position as the premiere microcomputer database, because in the meantime a product has appeared which I think blows dBase III out of the water in terms of power, portability and ease of use.

It's called Zim, a rather mystical sounding acronym for Zanthé Information Systems, its publishers. Actually it's been around for a while, but in its most recent incarnation – Version 3 – it finally has a manual which will allow the average dBase enthusiast to master Zim and make the conversion from dBase in a week.

Why should you bother? Because applications which would take a dBase expert a month to code in dBase would take a novice Zim programmer under a week; because truly enormous databases can be constructed under Zim, with up to 13 database files and 1000 indexes; because a Zim application can run on every machine in your company, from PC to network to mainframe, single and multiuser.

Zim's power comes from the way it integrates both data files and the relationships between them, its processing of data as sets rather than as individual records, and the power of and integration between Zim's on-screen forms and its database.

The Business Specialty Software survey in the May issue, which was generated from a Zim application, illustrates this power. There is no way that I would have considered writing a special program in dBase for one article; the time involved simply wouldn't have been worth the paycheck. It took part of a couple of weekends with Zim, and made my work on that article significantly easier.

When you setup a Zim database, you enter into its data dictionary both the databases and the relationships between them. The Vertical Market (VM) in the May issue application consisted of four data-

Here's a Canadian developed database Steve Keen has been using – it blows dBase III out of the water, he reckons (so watch out, dBase IV!).

bases: Dist which stored the distributors, Prod for the Products, Industries which stored valid Industry names, and Inds which listed the Industries which each product serviced.

Dist and Prod were linked by a common company code; that information was stored in a relationship called Market, which had an alternate name of Soldby. The product code link between Prod and Inds was stored in a relationship called For, with an alternate name of USE.

The single line –

```
"FIND ALL INDS USE PROD SOLOBY DIST
sorted by industry company product"
```

generated the collated information from three databases from which the complete report was produced (Industry, Company and Product are field names from the Inds, Dist and Prod databases respectively). The subsequent reporting code, which produced the report, took just 74 words of code.

With dBase, the alternatives would be either a series of complicated JOIN commands and the creation of additional databases and index files to store the information (which would probably exceed dBase's DOS-imposed limit of 16 open files at once), or three cascading procedure files (one for each database) involving DO WHILE loops, SELECT and SKIP commands to process individual records in each file, and a mess of reporting code in the middle.

Data entry

Data entry in Zim is similarly impressive. Its equivalent for dBase's FORM-MAT screens are forms. They are designed using a function key controlled screen painter, which controls everything you could wish for: field and prompt layout, justification, colour, error checking, date format, default entries. You can have as many forms as you like for each database. If a form and a database have identical field names, then the lines –

```
CHANGE form FROM database
FORM DISPLAY INPUT
CHANGE database FROM form
```

pack all the data entry punch for which experienced dBase programmers usually need a page of @ SAY ... GET commands for form layout, APPEND BLANK and REPLACE commands.

But that's only the tip of Zim's form handling iceberg. Several forms can be combined into a display, and each form can be repeated as many times as you like across and down the one display. Each form can relate to a different database, allowing you to show and update related information from several files on the one screen. This lets you emulate a typical paper purchase order form, with customer details up the top, and room for, say, 10 purchases on the one screen.

Forms can be overlaid on top of each other and the bottom ones later refreshed, allowing a form of windowing. Built-in scrolling and subscripts to refer to individual forms within a repeated series enables 'point and pick' techniques for data entry.

There are some aspects of life under Zim which are more difficult than life under dBase, but these normally result from the greater discipline imposed by Zim's use of a data dictionary. In the washup they result in better programming practice and more easily maintained applications, though initially they are a bit strange.

All Zim objects – databases, database fields, relationships, forms, variables and so on – must first be added to its data dictionary and then separately created before they can be used. A typical sequence (which creates a text variable that stores the date in English format) is –

```
Add Vars let varname = TodaysDate
type = Char length = 18
decimals = 0 size = 0
Create Var TodaysDate
```

If you want to change the definition of TodaysDate – reducing it to eight characters to use DD/MM/YY format for example – you must first FIND the old definition in the data dictionary, DELETE it, ADD the new definition, and CREATE that. While this is initially more cumbersome than the willy-nilly creation of variables and amendment of databases in dBase, it has the advantages that your application is fully documented, and you always know precisely what variables, forms and so on you have. Fortunately, the whole procedure can be automated by putting the commands in text files.

Compiler

For the system developers among you, Zim comes with a compiler which generates compiled code that can be run from within Zim or by a runtime module. Zim is available under DOS, Unix and VMS to name a few, and code written for one operating system operates without modification on another. Zim can import information from other programs – such as dBase – if you first export that data using a delimited or columnar text file.

Your guide to all this database power is a cookbook published by a Canadian documentation house, NIVA (Zim is likewise a Canadian product), which is distributed along with Zim's far from perfect manuals. NIVA's *Guide to Zim* is what all manuals should be: superbly expressed,

Product Details

Product: Zim Version 3
Distributor: Zim Service Centre,
17th Flr, MLC Centre, Martin Place,
Sydney 2000 NSW
(02) 229 5157
Price: \$1595 DOS version,
\$2400 Xenix version.
Both prices taxed.

well laid out, a comprehensive tutor to the program. It develops step by step a sales application which uses five databases – Products, Invoices, Suppliers, Orders, Customers – and involves large slabs of code which can simply be lifted and modified for your own application. The entire appli-

cation is supplied on disk, and with a few modifications (such as postcodes instead of zip codes) it could suit many organisations as is.

As for myself, unless dBase IV is a world ahead of its ancestors, I ain't gonna study dBase no more! □

```
Procedure RepPI ()
  Find Inds use Prod Soldby Dist sorted by Industry Company
  Product -> IndsProdDist
  Report from IndsProdDist
  Report Heading "Vertical Software by Industry"
  ; line 1 center newline
  "Produced on ": newline center:
  $date : mask "DD/MM/YY":
  Break 1 Industry
  Heading
  "Industry: " :newline 3: :center:
  Break 2 Company
  Heading
  Company :newline 2 center:
  Detail line column headings off
  Product :newline 2 width 35 wrap:
  (Price where Price > '0') :column 60 mask
  "$$$,$$$.$99":
  Prod.Comment :newline 2 width 75 wrap:
  Page Footing
  $concat("Page ", $page) : center newline 3:
  EndReport
Endprocedure
```

Listing 1. The Zim code for the report generator used in the *Business Specialty Software Survey* in the May issue.

```
form select dwind
Let fwindframe.message = "Pick Industry" fwindframe.prompt = "F10
Select Movement Keys"
Find industries sorted by Industry -> Indlist
Change all fwindrow from Indlist
form set cursor protected
form set (unprotected) fwindrow.Pick
form set exit escape PAGEUP PAGEDOWN HOME END F10
form display noclear % display without erasing dadd, previous
form
while
  form input
  if $transmitkey = 'escape'
    break
  endif % $transmitkey = 'escape'
  if $transmitkey = 'PAGEUP'
    up 7 Indlist
  Endif % $transmitkey = 'PAGEUP'
  if $transmitkey = 'PAGEDOWN'
    down 7 Indlist
  Endif % $transmitkey = 'PAGEDOWN'
  if $transmitkey = 'HOME'
    top Indlist
  Endif % $transmitkey = 'HOME'
  if $transmitkey = 'END'
    bottom Indlist
  Endif % $transmitkey = 'END'
  if $transmitkey = 'F10'
    % transfer highlighted industry name to relevant Finds
  field
    let vindustry = fwindrow.Industry[$subscript]
    Break
  Endif % $transmitkey = 'F10'
  form clear fwindrow
  change all fwindrow from Indlist
  form display fwindrow
endwhile % window scrolling code
form display fwindblank % blank out window portion of screen
form restore % restore the dadd display
```

Listing 2. The code for a pick and choose window. Built-in scrolling and subscripts to refer to individual forms enables 'point and pick' techniques for data entry.

CHIEF

customer tracking and invoicing system

I HAVE HAD the dubious privilege of looking at a number of accounting packages in my time. As a non-actuarial type, the scope offered by the majority of them is way beyond my comprehension or needs and I have had to seek expert help in evaluating their abilities. Most of my friends who seek advice about what software to buy seem to suggest that all they need is 'A simple invoicing and statement program, something simple to set up and operate.' Many small businesses have no need for stock control or deep sales analysis, and most accounting packages offer this with prices which (quite rightly) reflect its inclusion.

Chief is an excellent starting point for those wanting to take the drudgery out of straight forward invoicing, statements and bank transactions. Additionally, the generation of the customer files builds a database which offers a bonus customer tracking ability. By this I mean the ability to search through your customer list for clearly defined groups of customers. These groups may be defined in any way you choose, and selected by type, for example, customers, creditors, suppliers or user defined types.

Businesses which will most find Chief of use are not big enough to require such additional accounting functions as payroll, accounts payable, or balance sheet generation. The invoices and statements generated by Chief are enough to give to a professional accountant at the end of a financial period and let him work out if you're still solvent. One thing is certain, the cost of Chief will not add a lot to your cash flow problem.

Software writers need support!

Chief arrives at your door in a semi-rigid plastic slip cover which contains a three ring binder, loose leaf manual. The warranty on the disk (1 year) is detailed and has (rather than the usual cold copy-right notice) a gentle prod discouraging

If your business doesn't need stock control or heavy sales analysis, why pay for it? asks Ewart Stronach.

piracy – it points out that the program is totally designed, written and produced in Australia and Australian Software Writers need your support. (So do Australian Journalists – so read more!) There is also an invitation to criticise the product.

A description of the minimum requirements of the system follows: XT, AT or compatible, 360 kilobytes, mono or colour monitor, two floppies or hard disk and manual and, of course, a printer. Your system should be configured for 20 Files and 15 Buffers and an example of the necessary CONFIG.SYS file is given before clear instructions for copying Chief onto a working diskette or your hard disk. The program is un-protected and installation should be easy even for a new user. After copying the program, entering 'Chief' should present you with the title page or one of two messages. The only error messages at this stage would be a query about your monitor (colour or mono) or a warning that not all files have been transferred successfully.

The opening menu is simplicity itself. It

CHIEF VERSION 1.3

A NEW VERSION of Chief is now available. Version 1.3 has a number of enhancements including a browse facility to step through and view the past invoices for each account; account aging by 30, 60 or 90 days for each customer permanently displayed on their screen; improved reporting including running totals in printed reports and improved speed, performance and error handling.

offers only three choices: Enter or Edit Data, System Maintenance or Exit. First time users are instructed to enter the system maintenance section and configure Chief for their default setup. This section offers the choice of file names for stored data and suggests logically that invoices should be filed as INVOICE.TXT, accounts as ACCOUNTS.TXT and so on. Accepting these defaults makes sense for a new user and allows an experienced user to set up more than one operation of the program on the same disk. The user name is entered and becomes the heading for invoices and statements to be printed out later.

Enter/edit data

Chapter Two of the manual describes the conventions used in a clear manner and then covers the Enter/Edit Data screen ? see Figure 1. This screen is divided into three separate windows. The first describes the essential information about the client, arranged as formal data fields, the second is a 'free form' comments section and the third, a selection menu for different tasks. The field descriptions are self explanatory and cover names, addresses, contact names and so forth. The Type field allows the categorising of clients in any way you wish with the only with reservation of the category Bank which is limited to the production of deposit or withdrawal slips.

The notes section is, as I mentioned, free form and you are advised to precede any notes with a date for easy later searching. There is provision for a Last Contact and Next Contact date for prospect systems.

The online help screens are well presented and should dispense with the 'open documents' syndrome fairly quickly. Use of the F1 key pulls down a Help Main Menu over the current screen and easy menu selections by either placing the highlight bar or single key entries corre-

sponding to the help category, presents a page or more of information. After reading the help files the Escape key returns you to your program. The help files all direct you to a specific page in the manual for further information.

The first area is for allocating either a name or number to your account. As with most data bases, Return moves you on to the next field, in this case, a Contact Name. Proceeding through the fields seen in Figure 1, the only one which requires any further explanation is Type – a four character field in which you may use any four letters you need to distinguish your account types. The only reserved word is Bank.

Entry of data is not a problem with plenty of opportunity to correct errors before committing the screen to memory, and an active On-Line Help file behind the F1 key. Once your files are built up, selecting the first menu option of Enter/Edit data will display a screen like that in Figure 1.

A powerful feature of Chief is the Account Filter which is used for selective sorting and reporting – see Figure 2. Use of standard mathematical signs in conjunction with pre-defined Types allow you to be most selective in your sorting. A comprehensive series of examples of filters is given in an appendix to the manual.

The default set-up of the program is adjustable to your needs; in the original setting it's right for a standard business form of the type generally available at your local stationer or computer supplier. Labels are printed to a default of two labels across a standard A4 page, and resetting this parameter allows custom labels to be produced with information from any of the fields. Data backup is automated, again by easily understood menus and there is plenty of warning given if Chief thinks you are going to do something nasty to your data collection.

The manual is well written and follows a clear course through setting up, data entry and editing and a very concise tutorial. Appendices cover customisation of the database and printing instructions and deeper instructions (for those familiar with dBase III) for importing files.

The program is well-enough presented and explained for a complete novice to computing to be 'Up and Operating' without any further help than that which is available from the manual. It will certainly fill a niche in the bottom end of the accounting package market, and with its compatibility with dBase, could form the basis of a larger system in the future. It's local, it's cheap and it's good! □

Account : Best		Help F1 F2 Account Select	
Contact : Count de Monet		Invoice F3 F4 Payment Received	
Company : Best Bank of Australia		Wdr1/Credit F5 F6 Account Filter	
Address : 240 Interest Rd.,		Label Print F7 F8 Add an Account	
Penniless		Save Data F9 F10 Print	
1835		ESC to abort/exit from screen	
Type : BANK CUST/DEAL/BANK/TRND	Sales \$ 0.00	Balance \$ 161.66	
Phone No: (03) 123 4567	After Hours (03) 987 6543	Contact dates Last 01/07/87	Next 01/07/87
Notes : Kolarious trading account.			

Figure 1. Chief's Enter Edit Data screen is divided into three separate windows. The first has information about the client arranged as formal data fields, the second is a 'free form' comments section and the third is a selection menu for different tasks. The Type field is used to categorise customers according to user-defined criteria.

Acco	INVOICE			lect ceived lter bunt reen ance 0.00 5/07/87 e for
Cont	To: Santa's Workshop	Invoice No:	13	
Comp	Shop 9	Date :	07/12/87	
Addr	Westfield Shopping Centre			
	Doncaster	3108		
Type	one large reindeer	Tax	Price	
		23.50	235.00	
Phon				
Note				
		23.50	235.00	
	TOTAL		258.50	

Product Details

Product: Chief customer tracking and invoicing system
 From: Ideal Systems, Vic.
 Distributor: Real Computers, 144
 Lester St, Carlton 3053 Vic.
 (03) 347 2511
 Price: \$299 taxed

Figure 2. The Account Filter can be used for selective sorting and reporting – the filter is used to set conditions that an account must meet. For example, if the filter was given parameters POSTCODE 2000: TYPE = CUST: LASTCON < 01/06/87: BALANCE > 1000, then the sorted report would contain details of only those CUSTOMERS inside the NSW 2000 postcode area who had not been contacted since BEFORE JUNE 1st 1987 and had an ACCOUNT BALANCE more than \$1000.

COMPUTER AFTERTHOUGHTS

Office Supplies and Ergonomics

LETS FACE IT, while computers can be very useful, they can also be space hogs. Is your work surface dominated by your computer? Does it leave any room for your other tasks? If you feel that overcrowding has gone far enough and you would like to shove that workhorse out of the way, read on for some possible solutions.

The old flat topped desk is probably the piece of furniture most people use as a support for their PC, monitor and keyboard. This configuration, with the monitor sitting on top of the system unit and the keyboard in front of it is commonplace, and if you are using the computer continuously, it works quite well. However, it is not really all that satisfactory because it lacks flexibility, and for people who spend long hours at the terminal, it is not a sensible ergonomic approach to efficiency in the work environment.

The flat topped desk is not a flexible solution because the system box, monitor and keyboard take up lot of room, especially if you have one of the models with wide open spaces and sufficient territory to play a game of bridge on its lid. Chances are the computer and the monitor are both too heavy to move out of the way every time a non-computer task presents itself, so they stay right there on the desk, doggedly taking up valuable space.

If you use the computer continuously, and have no need to move it out of the way, then you qualify for an ergonomic workstation that ensures the correct positioning of your body to the keyboard and the monitor, reducing the chance of back fatigue, RSI complaints and generally making life in the office more productive.

Adjustments can be made to the height of the monitor to provide a proper viewing angle, the angle of the screen to reduce glare and reflection, the height of the key-

You have taken the plunge and purchased an amazing computer. You have bought some tremendous software that will do wonderful things.

But wait a minute, where are you going to put it?

What are you going to do with all of those diskettes?

How will you keep your drives clean?

How are you going to make room for the printer?

What about static?

These are all the things you don't think about until your computer is up and running — computer afterthoughts.

board to permit correct placement of forearms to eliminate tension and keyboard angle to provide a comfortable keyboard strike angle and reduce wrist tension.

There are various adjustable desks available which allow for the computer and monitor to be moved out of the way when necessary, and other models which provide full adjustments to suit the individual's needs regarding monitor height and keyboard height. Combine these with a height adjustable chair and your major ergonomic needs have been met.

Sylex, (02) 647 2888, is an Australian manufacturer of ergonomic furniture. It specialises in computer furniture including workstations, computer tables and printer stands. You can choose from a range of fixed and mobile models, many with height-adjustable surfaces. Within the range of workstations, the EC models make it possible to adjust the height of both monitor and keyboard supports, and the HM range gives you the option of being able to tilt the keyboard as well. This is designed to provide a comfortable keyboard strike angle for the operator, and acts as an aid in reducing wrist tension. The new HM 1000 is adjusted by means of a retractable handle which activates a drive mechanism to raise or lower the table top from 565 mm to 730 mm. The table top is counter-balanced using twin gas cylinders for smooth and effortless operation. It also has two cable ports on the table surface which can be used to keep cables off the desk top, and which allow the workstation to be placed flush against the wall. The HM 1000 is a top of the range model, and costs \$975.

The Fleximax table, also by Sylex, has a generous workspace together with height adjustments on both the monitor and keyboard platforms. The Cadtek is specially

built to suit Cadcam systems, with monitor and keyboard platforms adjacent to a drawing board. Sylex also manufactures tables that are suited to cluster operations and workstations that can be locked up. There is even a table that can be adjusted hydraulically.

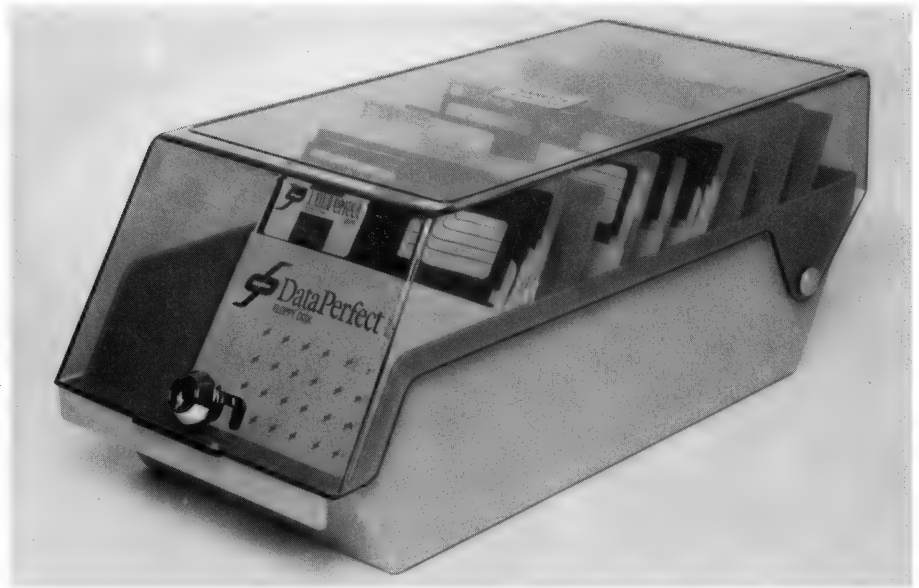
But maybe you require something even more flexible than an adjustable workstation. Some offices have computers that are used by more than one person, and the portable workstation is designed to enable a PC to be transported from place to place with relative ease.

The Taskmaster is a portable workstation made by Sylex, and it costs \$375. In basic form it consists of a keyboard and a monitor platform, both of which can be adjusted for height and tilt. There are optional add-on side stands for a printer or for extra work space. One of the units in the Dataflex range, also made by Sylex, is the Micromate, a portable workstation designed to carry monitor, keyboard, computer, printer and paper feed. It is fully adjustable, has folding side flaps to enable movement through doorways, folding footrests, and lockable castors to prevent the whole lot from running away. The Micromate DF2 costs \$655.

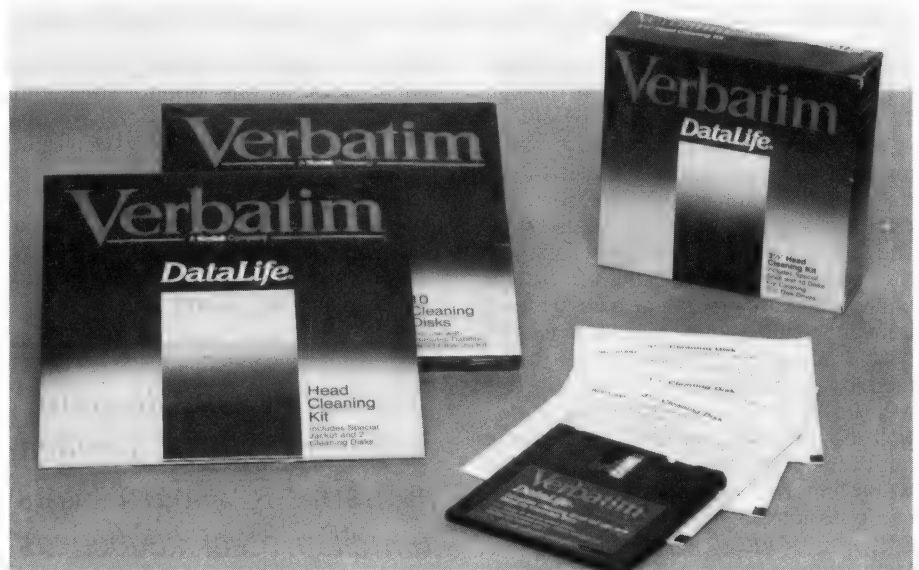
You may find that you have been paying extra for brand names . . .

Another Australian product, by Hood Ergonomics and supplied by Word Express, (02) 439 8966, is the portable Spacemate. It also has the capacity to carry computer, monitor, keyboard, printer and printer paper feed in one unit. The frame is made of epoxy resin coated steel and it looks very sturdy. It has two removable baskets for fanfold paper, but it does not have a footrest. The Budget Desk, from Wilbroprint, (008) 22 5542, is lightweight but inexpensive. For \$89 you get two shelves with enough room for keyboard, monitor, printer and mouse.

If you are looking at furniture, watch out for details such as the width of the keyboard platform; some of the older workstations may not have platforms wide enough to accommodate the extended IBM AT keyboards. If you are using a mouse, you need a surface wide enough to accommodate it next to the keyboard.



Secure storage for disks saves your data from damage. This one holds 100 in a convenient to use lockable box.



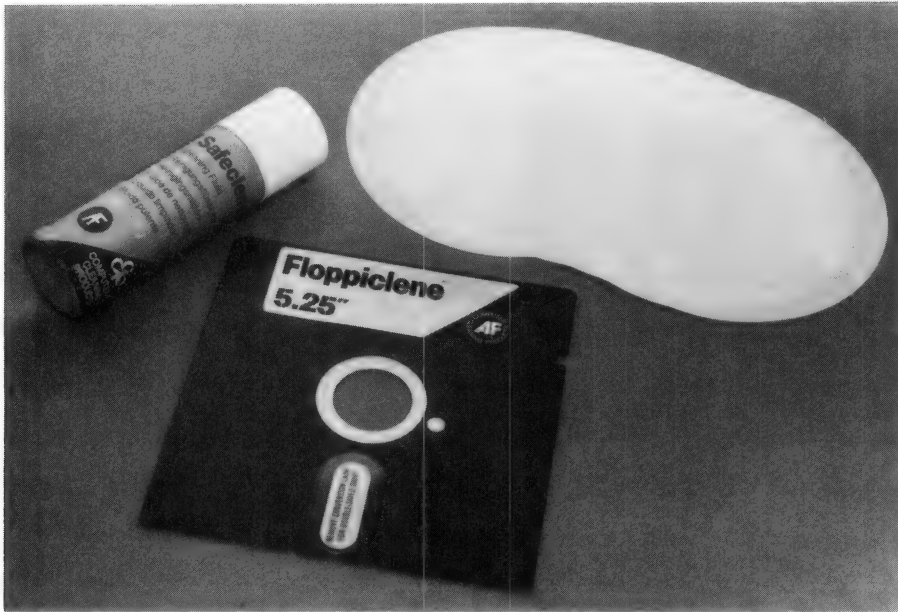
The Verbatim head cleaning kit comes with a special shell and 10 cleaning disks.

Other details such as a non-reflective covering and rounded corners can also make a difference.

Raise your monitor

Monitor stands are useful for raising the monitor to a level that is more comfortable for the operator. Many users have the monitor sitting on top of the computer's system unit, or on the desk itself. This can mean that the monitor is too low down for the operator and can lead to strained neck and shoulder muscles.

The most comfortable position is generally the most efficient in terms of productivity. If you feel more comfortable with the monitor at eye level, an elevated platform of some sort is what you want. A good stand should allow you to adjust the screen position by swivelling it around. Through tilting the screen you can avoid glare and reflection from windows and room lights. The most basic stands consist of a swivel action only, and are limited in their usefulness. The Monibase, from Sylex, comes in two sizes to suit different sized monitors. The Model 5 costs \$35 and



Case and Keyboard Cleaning Kit by AF. It includes Foamcylene anti-static foam cleanser, lint free cotton buds and non-woven cleaning cloths.

the Model 6, \$39. It can be swivelled through 360 degrees, and tilted through 12 degrees up or down.

The tidiest solution to a desk space problem, and the most flexible, is to put the computer unit on the floor, held upright in a stand so that it cannot fall over, and to use a monitor arm which clamps to the rear of the desk. Placing the system unit on the floor may not be a good idea if it means that it is more likely to breathe in dust through its openings. The tower models are designed to be used in this way, however. The monitor is supported well above the desk top, and can be swung out of the way when you are not using it. Wilbroprint & Computer Supplies has two models available, the Desk-Mate and the Ergo-Arm. Made in Australia, the Desk-Mate Monitor Mover (\$350) has a vertical height adjustment of 180 mm and can swivel through 360 degrees on precision bearings. It can hold monitors up to 30 kg and clamps on to any desktop with an overhanging lip. Cables are kept out of the way by means of a tidy cable management system, and the monitor can be tilted as well.

The Ergo-Arm, made by Hood Ergonomics (\$336), has a bi-fold action, or a double hinge, which allows greater flexibility of movement. It rotates 360 degrees, has a 175 mm height adjustment, a tilt action, and a multi-path movement within a radius of 450 mm. The monitor platform has a handle which doubles as a

keyboard support so that it too can be swung out of the way. Monitor arms from the VMA range made by Sylex have optional keyboard holders. The VMA 004, at \$350 is the latest addition and features automatic tilt fixing so that the monitor platform stays parallel to the desk. It has a counter-balanced gas lift action for easy adjustment and cable ducting to keep those cables from running wild.

Costly repairs to your keyboard can be avoided by using Keyboard Seals which protect keyboards from spilt coffee or dusty environments.

Of course, you can always attach a monitor arm to your old desk, and to complete the picture, why not add a keyboard arm as well? This is a platform that attaches to the underside of your desk and supports the keyboard. It can be adjusted for height and tilt and the keyboard cable, which always seems to get in the way, can go beneath the desk.

If your desk has a return, you have probably cursed the fact that it is too narrow to

fit the system unit, monitor and keyboard. This problem is solved by using the keyboard drawer (\$109 from Sylex) which sits beneath the system unit. It supports the keyboard on its own work surface which slides out when required and locks into the open position to provide a firm keying surface. It has a built in wrist support and when it is not being used it can be slid back beneath the computer out of the way. This is an elegant solution which also has the advantage of lifting the monitor by about 10 centimeters. A similar approach for the ordinary desktop is the Keyboard Park (\$49 from Sylex). It supports the system unit and monitor above the desk surface and allows the keyboard to be parked out of the way beneath them when it is not being used. This liberates valuable desk space and, combined with a tilting monitor platform, is a very economic alternative to using a monitor arm.

An ergonomic chair will perhaps be one of the most important pieces of furniture you acquire, especially if you spend long hours at the computer. A well designed chair should feel 'right' for you after you have adjusted the height and the level of the back rest. Sylex has two models of ergonomic chair available, the Postulift from \$330 and the Synchrolift for \$534.

Now that we have dealt with the larger elements of furniture and have accommodation arranged for the computer and monitor, as well as a comfortable place for your good self, what other ways are there to make life easier in the office (apart from moving it to a tropical beach)? There are all sorts of small additions to the basic furniture, such as wrist supports, adjustable foot rests and copy holders to keep the user's bodily parts from going to sleep after a big lunch, and to provide support where it is needed to reduce strain in the muscles of the shoulders and back.

An anti-glare screen can save a lot of eye strain and headaches. The idea of a screen filter is that it clips on to the front of the monitor to prevent reflections from sources such as windows and overhead lights. It also reduces low level radiation and glare that comes at you through the screen while the monitor is operating. The Glare Guard Professional (\$179) employs a thin film optical coating similar to those developed for NASA's Space Shuttle windows. According to Wilbroprint & Computer Supplies, it is simply the best VDU filter available. It eliminates 94 per cent of all reflected glare whilst retaining 100 per cent character clarity, and it protects you from 98 per cent of all the low frequency radiation coming through your screen. The

The way to go...

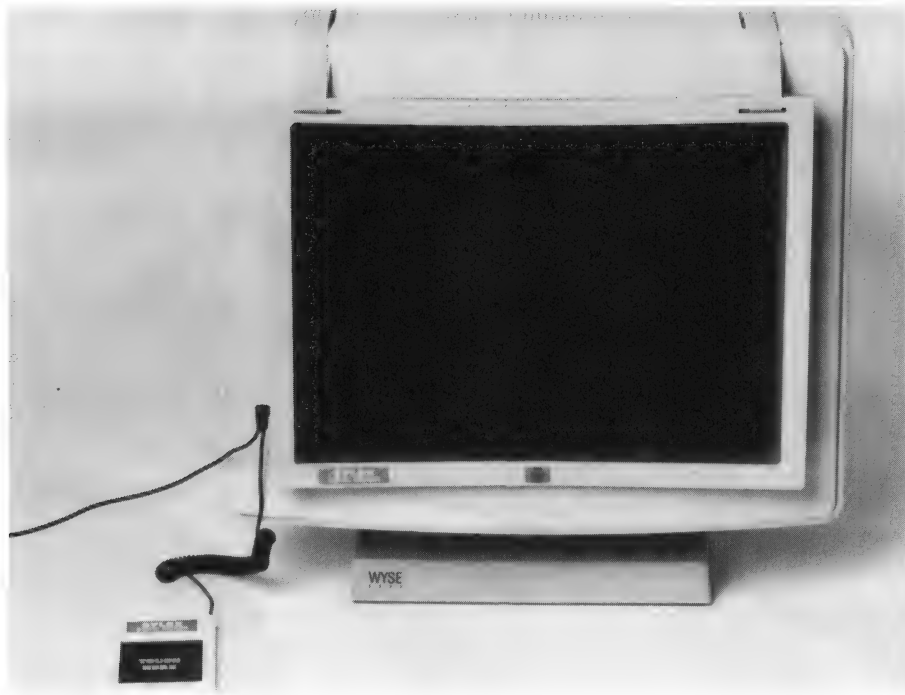


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2a Blakesley Street, Chatswood, NSW 2067

Telephone: (02) 419 5799. Fax: (02) 419 8445



The Static Kicker from Sylex performs the dual function of monitor filter and static control.

A source of potential trouble if your computer is attached to a modem and to the phone lines, is the very real possibility of a lightning surge coming through the phone lines.

new static control coating drains static from the monitor and routes it safely to a grounding plug. This prevents dust from being attracted to the screen.

Other screen filters are made of a micromesh material that will not allow light to penetrate from an angle. This cuts down on reflections and only allows light to travel through the mesh perpendicular to the screen. The black mesh enhances the screen contrast and cuts glare at the same time, and is particularly suitable for monochrome text work. One problem with these sorts of filters is that the electrostatic charge emitted by the VDU attracts

dust to the screen and clogs up the mesh.

Sylex has produced a combined screen filter and static control for the operator in its Static Kicker. The dangers of static are discussed later in this feature – suffice to say that 'zap free' working conditions should be encouraged. The Static Kicker is a fine mesh grid that mounts on to the front of the VDU with velcro tabs. It reduces screen glare and reflections and also works to form an earthed shield across the face of your monitor. The frame of the filter is grounded, and a touch pad is attached to it so that the operator can discharge any static immediately before beginning work. A small lamp glows to indicate that the static is being eliminated. For \$79 the Static Kicker is good value for a combined screen filter and static control.

According to Sylex, the electrostatic charge on the face of the VDU screen ionizes dust particles, exciting them and causing them to attach to nearby surfaces, often the operator's face. This, along with glare can contribute to the symptoms and problems associated with extended VDU use such as tired red eyes, facial skin irritations, and fatigue. The Static Kicker is designed to prevent all of these problems, as well as eliminating static charge carried by the operator. And for the problem of dust clogging the mesh, Sylex has pro-

duced the Tack Roller, which looks like a miniature paint roller that picks up the dust as it is rolled over the surface of the screen.

Mouse Mats

There are different types of mouse, and the latest non-mechanical ones use their own reflective grid surface which virtually eliminates wear and tear. Mechanical mice have a ball and socket that rolls around on your desktop. If you are a heavy user of the mouse, you may like to use a mouse mat to prevent the mouse from picking up grit and dust from your desktop, and to prevent your desktop from being gradually gnawed away. The mouse mat can be purchased at a sometimes exorbitant price complete with brand name, or you can achieve the same result with a scrap of wetsuit material or a plastic place mat. The Sylex Rodent Rug is a soft textured vinyl rectangle that sells for \$29. This is a small price to pay considering the cost of a new mouse, not to mention the cost of a new desktop when your French-polished number gives way to the rampaging rodent.

Costly repairs to your keyboard can be avoided by using Keyboard Seals which protect keyboards from spilt coffee or dusty environments. These are also available from Sylex for \$49 and are made out of Ultrafilm, which is a strong, clear, plastic. They are only a few microns thick and retain a tactile keyboard response. The Keyboard Seals are form-fitted to nearly all popular makes of keyboard, and according to Sylex, they will not become brittle with age.

Electrical Mischief

A potential threat to your hours of hard work is always present in the form of static. The big problem is that you can carry around huge voltages without being aware of it. Static builds up as you move around, especially if you are walking on a carpeted surface. This can reach levels in excess of 20,000 volts without causing any harm to humans, but it wreaks havoc with sensitive microelectronic components inside computers, and it can corrupt the data stored on floppy disks in a flash.

There is a simple solution, apart from making backups (which you do anyway, right?), and that is to earth yourself before you touch any of your disks or your keyboard or computer. Any large metal surface is good for this, especially if it is an electrical appliance that is earthed and plugged in to the wall socket. But if your desk is located in the centre of a large car-

peted area and you are not trained in the art of levitation what you need is an anti-static mat.

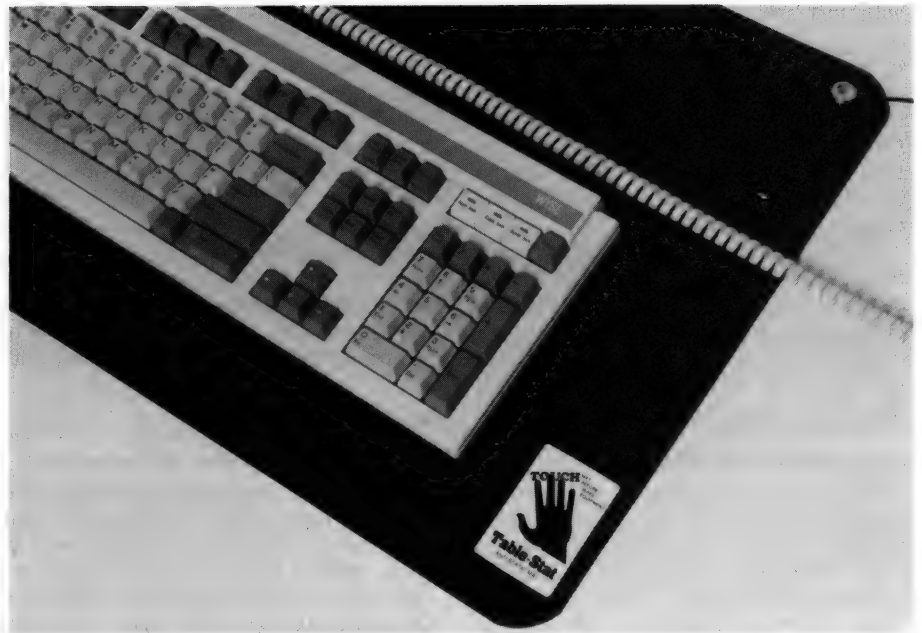
The keyboard mat is designed to be placed under a keyboard, and attached to a nearby grounding source with a snap on wire. By simply touching the mat before you begin work, built-up static is siphoned away. The chair mat is a similar idea, except the charge is dissipated through stepping on the mat as you sit down on your chair.

Another form of electrical mischief that can wreck your computer's insides is the power surge. This can be caused through lightning in the area, faulty cabling, or power fluctuations due to heavy electrical equipment operating nearby. The power surge, or spike, comes through the electrical wall socket, which is the best place to arrest its movement before it reaches your computer and causes a major disaster. The Surge Suppressor from Word Express, (02) 439 8966, is capable of absorbing 55 joules of electrical energy for 10 seconds and can handle peak currents up to 4000 amps for 20 microseconds. It costs \$165.

A source of potential trouble if your computer is attached to a modem and to the phone lines, is the very real possibility of a lightning surge coming through the phone lines. Phone lines are more susceptible to transient power fluctuations than earthed power lines. ABE Computers, (03) 288 2144, markets an Australian device, called appropriately the Telephone Safety Device (TSD) – it is about double the size of an ordinary phone plug, and is easily inserted into the socket in the wall. For \$39 you may save a lot of downtime in lost data or damaged equipment. It has been tested in the High Voltage Laboratory at Monash University and it comes with a 'forever' guarantee.

How often have you tried to connect a piece of equipment and found that a different connector is needed or that you have the wrong gender? Arista Electronics has a number of accessories from fully configured break out boxes to joystick extension cords. Its RS232 Mini Patch Box has male and female 25-pin inputs and 25 short leads with tinned ends that can be used for patching any configuration of input to output, and comes complete with instructions. Arista also has several data switches for situations where two computers are connected to one printer. Check out your local electronics store for these products.

In a situation where you have multiple computer/printer/modem connections to make it can be frustrating to have to dis-



Uncontrolled static can ruin data and effect the sensitive electronics inside computers. The Table-Stat is an anti-static device that siphons away static charge from the operator before it can do damage.

Disk drive heads can become coated with dust, smoke and oxide particles from disks, and this can eventually lead to gaps in transferred data.

connect and reconnect the various plugs. With T Switches from Word Express you can connect two printers to one computer or two computers to one printer. There are different models to suit parallel or serial connections, and up to six peripherals can be connected to a single port by piggy backing several T Switches.

Manage your media

Floppy disks are easily taken for granted, but they can hold a lot of valuable data and they do need to be protected from magnetic fields, spilt coffee, and rough handling. The 3 1/2 inch floppies that are used in laptops, Macs, Amigas and OS/2 machines are encased in plastic and are much more durable than 5 1/4 inch disks.

The best way to keep floppies safe is to

keep them in a box that doubles as a filing system. There are many of these available in various sizes, and many also have locks to prevent theft (although there seems little point in locking up something as small and portable as a disk box). Capacities vary from 30 to 100 disks per box.

Most of the time you may only need to have three or four disks close at hand. The 3M company, (02) 498 9333, has developed a product called the Datasaver which is a plastic filing box that attaches to the side of your monitor with Dual Lock fasteners. Up to nine 5 1/4 inch disks can be stored upright and away from your work surface, close and handy. It costs \$28 and is supplied complete with colour coded labels. It can be easily removed from the side of the monitor and replaced with another Datasaver box. This can work as an effective filing system, protecting disks in transit between various users. To prevent data loss from magnetic radiation, each Datasaver has a Magnefoil magnetic shield covering the surface that attaches to the monitor.

Disk mailing boxes are available from the Computer Resources Company, (02) 439 3399, to protect your data from the ravages of the postal system, or for transporting disks in your briefcase. They are made of rigid plastic in sizes to suit 8 and 5 1/4 inch disks.

Disk drive heads can become coated

with dust, smoke and oxide particles from disks, and this can eventually lead to gaps in transferred data. The heads can be cleaned with special disks that are inserted into the drive for a few seconds. Cleaning kits should not be used too enthusiastically however, or you run the risk of wearing out the heads, especially if the cleaner is too abrasive.

Some cleaning kits consist of a plastic floppy disk jacket, several disposable cleaning disks and cleaning fluid. The idea is that you put some of the fluid on to the cleaning disk and put the cleaning disk into the jacket, then put the jacket into the disk drive. Floppiclone by AF computer products costs \$35 and it will give you 20 cleans of a 5¼ inch disk drive. Another alternative is to use a cleaning disk which is already impregnated with cleaning fluid. Verbatim makes a head cleaning kit along these lines, with a reusable jacket and two cleaning disks for \$12. More disposable disks can be purchased for \$2.40 each in packs of ten. Both of these are distributed by Wilbroprint.

Cleaning kits can also be purchased for cleaning the VDU and keyboard. The AF Case & Keyboard Cleaning Kit from Wil-

broprint contains an anti-static aerosol spray, 25 lint free cotton bud sticks, and 20 non-woven cleaning cloths. The Screen Cleaning Kit contains 20 anti-static screen wipes, and 20 cleaning cloths. The kits cost \$10 each, or you can purchase the items separately. Dust covers are useful for keeping the dust at bay when you are not using the computer. These are available in static-free cotton-backed vinyl in a range of custom fitted designs to suit your particular make and model of computer or printer. From \$15 for a Commodore 64 to \$53 for an NEC APC 111 from Wilbroprint.

Paper, ribbons and printer support

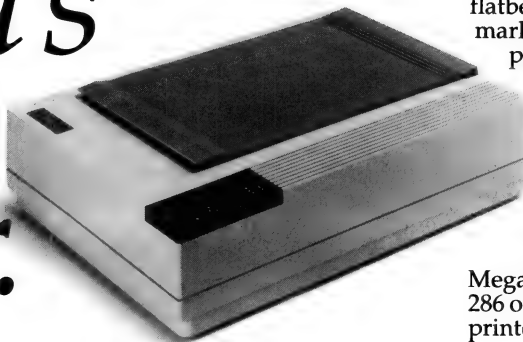
Printers are very useful until they run out of paper or their ribbons lose their ink. Paper is available in a wide range of sizes, weights and colours to suit any requirement. The Computer Resources Company, (02) 517 8888, has a comprehensive range of stock business forms suitable for all varieties of accounting software. It can also customize forms and letterheads to your own requirements, and it has its own design consulting and

colour co-ordination team which has produced some award winning designs. Colour screens, special effects and background photographs can all be used to advantage for enhancing the company image.

Micromart, (03) 690 9677, has a comprehensive range of paper supplies including pre-set computer forms, continuous adhesive labels, fax paper and photocopy paper, as well as ribbons and general computer products. Storing the output from printers can be a problem, and there are assorted binders, data files and suspension trolleys available. Wilbroprint & Computer Supplies also has a wide range of computer stationery, including forms, letterheads, membership and ID cards, ticketing systems, cheque printing and security documents. When you think about it, there is a huge range of computer stationery available and it is on the increase as new ideas make their way into products that we eventually see in our mailboxes.

How often have you been caught with a worn ribbon just when you want to print something important? The range of ribbons is almost as wide as the range of stationery. Check out the range from a sup-

president **MegaScan.™** *More than the world's fastest publisher.*



It's still no contest.

Nobody can beat the speed of a MegaScan-based system when it comes to scanning, manipulating or publishing images, photos and text.

MegaScan, designed by Advanced Vision Research, is the only system that combines a flatbed scanner with interface technology and graphics manipulation software into a single, integrated solution for any application. Desktop publishing, image archiving, OCR input and more.

The scanner: born in the USA.

The MegaScan Image Scanner is the only U.S. designed and manufactured flatbed desktop image scanner on the market today. It can scan line art or photos, at a resolution of 300 dpi and 32 levels of gray. All in just 9 seconds from scan to edit!

*The MegaBuffer™.
One card. One slot.*

Two jobs. Fast.

With 1.3MB of on-board RAM, the MegaBuffer is the interface between your 286 or 386-based CPU, scanner and laser printer. It also holds the full-page bit map

plier such as Wilbroprint and compare prices. You may find that you have been paying extra for brand names to suit your printer.

Laser printers have their own requirements when it comes to maintenance. Toner cartridges can be expensive to replace but there is a cheaper alternative to throwing them away and purchasing brand new ones. Interface Technology, (02) 809 6144, re-manufactures toner cartridges (as opposed to refilling them) and claims a 25 percent improvement in output into the bargain. Suitable for H-P, Apple, Canon, Impact and other Canon based laser printers, the remanufacturing process sees the cartridge cleaned, inspected, refurbished, filled with toner, re-assembled and sealed. Standard re-manufacture using ultra black toner costs \$99 including pickup and delivery. There is a full guarantee, and each cartridge can be re-manufactured from 4 to 7 times.

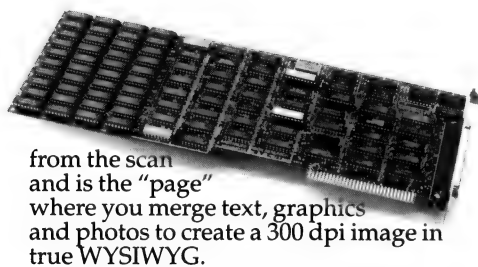
On the subject of printers, do you find yourself groping around beneath the table from time to time looking for the end of the continuous feed paper? Grope no more, what you need is a printer stand that keeps everything under control. They

range from the most simple, like a wire basket, to portable workstations that will accommodate printer, input and output trays, as well as computer, monitor and keyboard. The Paper Tamer printer stand is made from sturdy white plastic coated steel rod. The printer is supported by the paper tamer above an input tray that can contain 900 sheets of continuous paper. There is an output tray as well and it costs \$49 for 80 column printers or \$59 for 136 column printers, and it is available from Word Express, (02) 439 8966.

Many printers on sale today are quiet enough to have them operating in the open without the need for an acoustic hood. But if you are using an old dot matrix that clatters away in the corner, interrupting conversations and annoying your neighbours, you could be better off with some noise protection. Hood Ergonomics manufactures a range of award winning designs to suit various sizes and makes of printer. Each one has a fan to keep the printer from overheating, and the larger models have gas struts instead of hinges. These hoods are available from Word Express, along with several varieties of printer stands.

Sylex also manufactures acoustic hoods, with special models to suit various printer profiles. The 3000 with 400 Top Hat is designed for printers with top loading sheet feeders such as the Ricoh RP1600 and the Diablo 630. Sylex hoods are made from high grade materials for a long life. Lids have a counter-balance mechanism that will hold the lid in any position, and the hinge is a full length rigid extrusion aluminium leaf hinge.

There are more computer afterthoughts than those mentioned above, but we have covered all of the main items. Where to get hold of them? If the Yellow Pages are any indication, there are no shortages of computer equipment suppliers. You can phone for a price catalogue, order direct, or visit a showroom. A hands on demonstration is a good idea if you are buying ergonomic furniture – try it out first. Look for strength in design and manufacture. Some furniture such as an office chair may look ergonomic enough, but after a few weeks of solid use it may feel worse than the old brown model you replaced it with. Shop around, you may find some real bargains, especially for the items in most demand. □



from the scan and is the "page" where you merge text, graphics and photos to create a 300 dpi image in true WYSIWYG.

And with the full page in the MegaBuffer, zooming, scrolling and pixel-editing are real-time operations.

MegaScan eliminates laser-lag too. Because the MegaBuffer's 1.3MB of RAM also acts as a printer controller. So you can print direct to the laser printer engine for full-page 300 dpi output in just 10 seconds. Every time. Regardless of page size. Regardless of printer memory.

The software: power and flexibility.

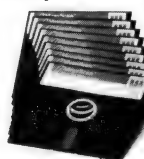
MegaScan software is a single application providing scanner control, a powerful paint/pixel editor, extensive image processing, text editing, page make-up and a screen snapshot utility. Also included is a RAM disk utility so the MegaBuffer card

can support other applications.

Use MegaScan software by itself to create short documents, or as a powerful graphics "front-end" to any GEM®-based publishing program like Ventura Publisher or GEM Desktop Publisher™ for long, complex layouts. File format options include TIFF, .PCX and GEM.IMG to support all other popular publishing applications.

Optimum options.

Optional capabilities include user trainable OCR, PC-to-FAX communications and font creation software to make it even easier to capture, edit, store, communicate or produce high-quality graphics and text.



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The Neostar 286 Mini



There may be cheaper AT compatibles on the market, but there can be few with the overall elegance and solidity of the Neostar, says Keith Mackay.

A 10 Mhz AT with 1 megabyte of RAM and a 44 Mbyte hard disk is the sort of thing I had always imagined fell only to the lot of others more fortunate than myself. However, after using this one for half an hour, I became quite keen that it should fall to mine with all possible speed; and after more protracted exposure to its wonders, using my normal spread of software at speeds I have long yearned for, this feeling solidified into firm determination.

The machine in question is the Neostar 286 Mini. In a discrete little box measuring 16 x 16 inches, it made The Engine, my old bog-standard XT compatible, look as clunky as its performance made him look distinctly silly; and the Neostar's hard disk was awesome in its speed – I am used to having the leisure to fill up the morning pipe and kindle it while The Engine comes to life and his hard disk fumbles through a fairly lengthy AUTOEXEC.BAT, but the Neostar barely gave me time to light a

cigarette before it was ready for action. Much as I love The Engine and however many bleared sunrises we have seen together, his time has come.

The first impression of the Neostar is one of great elegance: the case, as indicated above, measures some 4 inches less in width and depth than the normal-size box and an inch and a half or so less than the standard height. The saving in real estate is considerable – while The Engine dominates my desk, the Neostar fits unobtrusively into a corner and leaves plenty of space for the assortment of reference books and software manuals which normally surround me. The machine is also easy on the ears: its fan is very quiet and the hard disk is barely audible. Neither its size nor its decibel rating, however, gives any indication of its power – this is a machine of fearsome capabilities. Coming now to a more objective appraisal, the Neostar is standardly equipped with 1 Mbyte of RAM expandable via EMS to 8 Mbytes. Firm prices on expansion boards were not available when this review was written, but a figure in the area of \$2800 was quoted for an EMS board populated with 8 Mbyte of 80 ns RAM.

The machine runs with 0 wait states at 10 Mhz, switchable either via DIP switches (conveniently located at the back of the case) or from the keyboard to 6 Mhz. A yellow LED on the front panel indicates which speed is in use. In addition to one auto-switching 5¼ inch floppy drive, the Neostar has a Microscience half-height 44 Mbyte voice-coil hard disk with an average seek time quoted at 25 ms. I understand that the present hard drive is to be replaced with a vertically mounted 3½ inch model, leaving space either for a second floppy drive or for a tape streamer. One parallel and one serial port are fitted. There is no reset switch, which is a curious omission.

The documentation states that the Neostar will run under OS/2, Pick, Theos, PC-MOS and Novell. I was not in a position to attempt any of these alternative operating systems – none of which I am familiar with in any case – and ran the machine only under the supplied MS-DOS 3.30.

With the exception of the new Compaq DOS 3.31, DOS cannot use any more than 32 Mbytes worth of hard disk without partitioning, but I was surprised to find that the Neostar's drive had not been

partitioned – there were 12 Mbytes of storage space going to waste. However, a brief session with FDISK served to set up two logical drives of 32 and 11 Mbytes respectively, the balance having presumably been claimed by that demon within all computers which is responsible for anomalous figures of this sort.

The monitor supplied with the unit was a Sakata SA-2500 high resolution monochrome amber model. Since high-resolution is what I normally use, I was pleased with the choice and the Sakata's clarity and resolution were acceptable, albeit its contrast left a little to be desired.

The keyboard

The keyboard was the only feature of the machine I did not like, although this is in part the fault of the strange people at IBM who are responsible for the design. The keyboard supplied was a 101-key expanded type, with duplicate Ctrl, Alt and Enter keys, separate cursor control and the 12 function keys arranged across the top, where they have no business whatever to be; programs such as WordStar 4, Turbo C, Word Perfect and so on which make extensive use of the function keys, both alone and shifted, demand that they should be easily reached, and a combination such as Alt-F6 on this sort of keyboard is extremely awkward (and the two extra function keys are useless on most software). However, an 84-key keyboard is available as an alternative, although if it had the same spongy feel as the model supplied I would consider a third-party alternative.

Opening the Neostar up involves removing six Philips-head screws from the side of the case and one from the back, as well as ensuring that the keyboard lock is in the 'off' position. Although I poke around under the bonnet as seldom as possible, when the need arises I like to be able to get in and out with all due speed – screwdrivers are implements which awaken feelings of mild apprehension within my soul, and the less I have to do with them the happier I am. The Neostar's internal organs, then, could be easier to get at – a hinged lid would be a welcome feature.

Once the lid has been removed, the Neostar's insides prove to be as elegant as its outside, well engineered and robust, and the electrostatic speaker behind the front panel bespeaks the care and attention behind the design. The system's size demands horizontal mounting of the boards and sets limits to expandability, leaving two short and one long slot free. A

socket is available for an 80287 co-processor. The power supply (which, together with the disk drives, accounts for the bulk of the unit's 22 lbs) is rated to 118 W. This is rather on the light side, perhaps, compared with the usual 180-200 W power supply in AT machines, but given the limited expandability and the fact that there are only two drives, it is presumably adequate.

Floppy disk drive

The floppy disk drive proved to be something of a problem. In theory, the DOS FORMAT command used with the /4 switch will format to 360 kilobytes on a high-density drive, but practice proved to be another matter: disks formatted using the /4 switch on the Neostar were not always legible to The Engine, which on occasion reported the baleful 'General Failure Reading Drive A:'. and Norton Utilities Disk Test would find quite a number of bad sectors on these disks.

This is a common difficulty, however, and by no means restricted to the Neostar – a colleague of mine has the same trouble with his own AT-compatible and regularly uses my machine to format disks to 360 Kbytes. Anyone using a machine with a high-density drive and wishing to exchange data with 360 Kbyte-format machines would be well advised either to fit a 360 Kbyte drive or to maintain a stock of suitably formatted disks.

The real test

Moving onto to figures, a number of tests and benchmarks were performed. Norton Utilities' SysInfo gave a Computing Index of 11.2 (a standard XT = 1), a Disk Index of 2.7 and an overall Performance Index of 8.3. While the documentation quotes an average seek time of 25 ms, Coretest gave an Average Seek Time of 30.9 ms; the Data Transfer Rate was 163 Kbyte/sec and the Track-Track Seek was 4.1 ms. Nonetheless, 31 ms is certainly not slow – the average band-stepper type hard disk has a seek time of the order of 85-90 ms and a data transfer rate in the region of 80-85 Kbyte/sec. The Microscience drive, incidentally, uses the new thin-film plating, which is less susceptible to head crash than the older ferrous oxide medium. In theory, a crashing head will bounce off thin-film plating, while it will plough deep furrows in a ferrous oxide coated disk, with results which can readily be imagined. I did not, of course, attempt to verify theory in this case – there are some things which must be taken on trust.

As these figures show, the Neostar is no sluggard, and the hard drive is well matched to the system. The subjective test of day-to-day use – the only important one, ultimately – confirms the speed and power of both, and my general impression was that I was now seeing my software behave as its manufacturers intended. Speed is not everything, of course – there is another non-quantifiable index which might be termed 'overall comfort level', and for me the Neostar rates high in this area also.

	AT	PC	Neostar
HARDWARE			
Processor	80286	8088	80286
Clock Speed (Mhz)	6.77	4.77	10
BENCHMARKS			
Disk Write	16	37	7
Disk Read	12	31	7
Calcs	36	96	12
Sieve	117	306	39
Compile/Link	40	100	38
Total Time	221	570	103
Norton SI	5.7	1	11.2
CSR	2.579	1	5.53
Corrected Speed Rating			

Table 1. The Standard benchmark tests gave these results (all times in seconds).

Conclusion

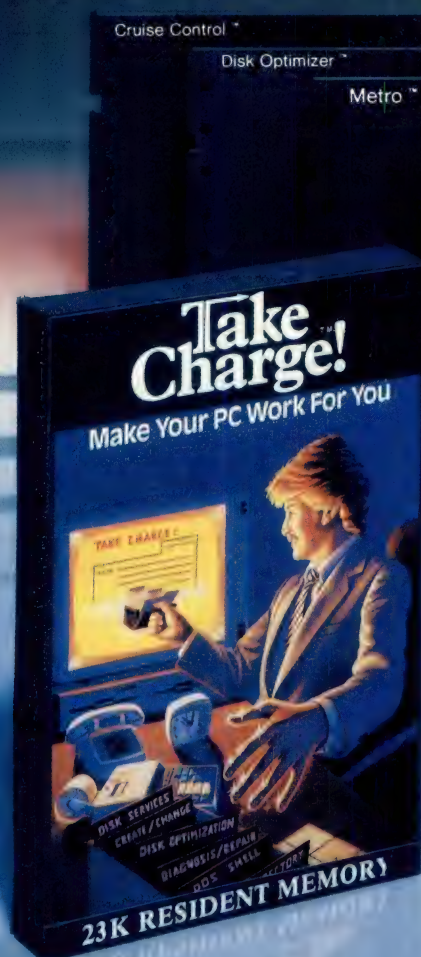
In summary, this is an excellent computer, packing a very respectable punch under the bonnet, and its reduced footprint is an added attraction to what would be a first-class product in any box. A machine of this calibre with a capacious voice-coil hard drive at a price just on the less painful side of five grand is very good proposition. There may be cheaper AT compatibles on the market, but there can be few with the overall elegance and solidity of the Neostar, and the two-year warranty reflects a well-founded confidence. □

Product Details

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TOWER OF HANOI

A perplexing puzzle

IN 1883, A TOY invented by the French mathematician Edouard Lucas went on sale. It was an immediate hit. The toy, marketed under the name Tower of Hanoi, consisted of eight disks of different sizes and a base containing three pegs. The aim of the game was to move the disks, one by one, from the initial peg to one of the other pegs in the shortest number of moves. The only rule was that you could never place a disk on top of one which was smaller than itself.

It sounds a simple game, but it is one which demands a great many more moves than you might think. Those monks, in the 'great temple of Benares beneath the dome which marks the centre of the world' (as the instructions with the original game explained it), were working with 64 solid gold plates. They have a brass plate, on which rests three diamond needles 'each a cubit high and as thick as the body of a bee.'

Apparently the creator put the 64 disks on one of the needles at the moment of creation, and told the hapless monks to get on with it, and move them. When they finish the game, they are told, the universe will pack its bags and go home. (The game instructions actually put it a bit more poetically: 'When the 64 disks shall have been thus transferred from the needle on which, at the creation, God placed them, to one of the other needles – tower, temple, and Brahmans alike will crumble into dust, and with a thunderclap, the world will vanish.')

How long will it take them until Thunderclap Day? If there are n disks, it takes a minimum (assuming you don't make any dumb moves) of 2 raised to the power of n minus 1 moves. The numbers increase quite rapidly. With 3 disks, it will take you 7 moves (in theory; it always seems to take me 12); 15 moves are needed with 4 disks, 31 with 5 disks, 63 moves with 6, 127 with 7, 255 with 8, 511 with 9, and 1023 moves when you have 10 disks.

Hour by hour, day by day,
monks in the great temple
of Benares are playing a
game. When they finish it,
the world will end, so Tim
Hartnell decided to give
them a hand.

That means our monkish persons, with 64 gold plates to move, will take 18,446,744,073,709,551,615 moves. If a plate was transferred every second, and the monks didn't drink their Horlick's and get any sleep, it would take them thousands of millions of years to finish the task (580,454,204,615 and a bit years, according to my calculations). Whew! I thought for a moment there that the Big Un-Bang was going to happen before the next Grand Final.

The eight disks provided with the original toy would take, as pointed out before, a minimum of 255 moves to transfer the disks. The program I've written for this article allows you to choose how many disks you want to transfer (from 2 to 9), then draws up the scene for you, and lets you get on with it. Needless to say, the program does *not* allow you to cheat.

Prove it!

If you want a mathematical project, try working out a proof that you can always move n disks in 2 raised to the n th power minus 1. I'd be interested in seeing your proof. Another project would be to write a program which would tell you the best way to move the disks. You can do this with the assistance of binary numbers.

Let's say you had three disks. You know, from 2 raised to the 3rd power minus 1, that it will take 7 moves. You write down the numbers 1 to 7, in binary, one under the other. In order to work out which disk to move, you count the digits from the right until you reach the first 1. The num-

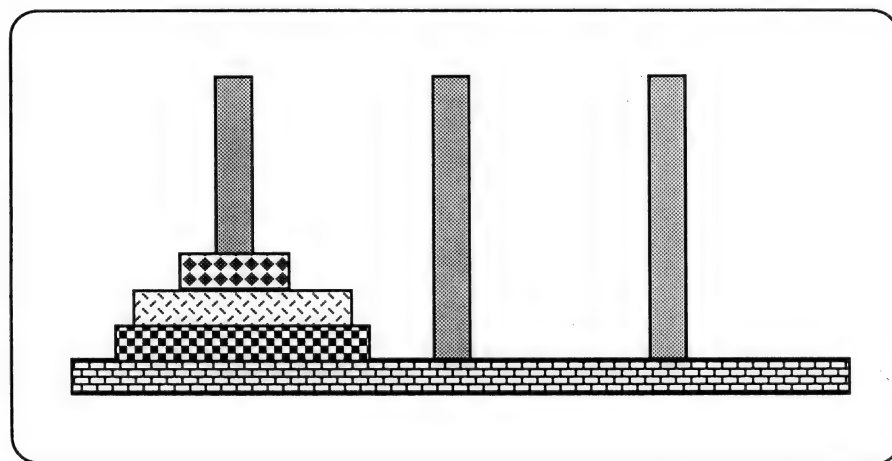


Figure 1. A three disk Tower of Hanoi requires seven transfers to move the disks from the left hand needle to the right hand one.

ber of digits you have counted will tell you which disk to move. You can see that, counting from the right with move number one, you'll hit a 1 right away, so you move the first (that is, the smallest, disk).

To find out where to put the disk, you start counting again and keep moving across the binary number. If you don't come to any other 1s, then place the disk on the first needle you come to. In this case, you'd place it on needle number 2. If you were on needle number 3, as you will be when using more than 3 disks, you move it to 1. If there are other 1s to the left of the first 1, you count across from the right until you hit the next 1. This identi-

fies the disk you moved on the previous move. Now, if there are no zeroes between the first 1 and the second 1, or there is an even number of zeroes, place the disk on top of the one you moved in the previous move. If there is an uneven number of zeroes, then you skip that move.

Here's how it works in practice –

- 1 – 001 Move disk 1
- 2 – 010 Move disk 2
- 3 – 011 Move disk 1 on disk 2
- 4 – 100 Move disk 3
- 5 – 101 Skip this move (odd number of zeroes between the 1s)
- 6 – 110 Put disk 2 on disk 3
- 7 – 111 Put disk 1 on disk 2

You might also be interested in writing a program which not only works out the above, but actually moves the disk for you. Then you could get it on the 64 gold disk problem, and start packing your bags for Thunderclap Day. The program given here with this article, can, of course be downloaded from the YC Bulletin Board, or you can get it from me on a 5¼ inch disk for the IBM PC, along with more than 40 other interesting mathematical-type programs, for \$10.00 (\$8.33 untaxed; I take money – don't we all – cheque or credit card). Write to me at this address: Tim Hartnell, Interface Publications, 34 Camp St, Chelsea, Vic., 3196. □

```

20 REM (C) TIM HARTNELL, 1987
30 REM INTERFACE PUBLICATIONS
40 CLS:PRINT:TOWER OF HANOI - TIM HARTNE
LL":PRINT:PRINT
50 DIM A$(9),B(20),C(20),D(20):MV=0
60 Q=9:REM CHANGE TO Q=5 ON AN APPLE OR
40-COL DISPLAY
70 PRINT "HOW MANY DISKS DO YOU WANT ( 2
TO";Q;")";:INPUT DK
80 IF DK=0 THEN END
90 IF DK<2 OR DK>Q THEN 70
100 Q=DK
110 PRINT:PRINT "PLEASE STAND BY..."
120 REM ** SET UP **
130 FOR J=0 TO Q:A$(J)=" "
140 B(J)=J
150 FOR Z=1 TO 10-J:A$(J)=A$(J)+" ":NEXT
Z
160 FOR Z=1 TO 2*J+1:A$(J)=A$(J)+" ":NEX
T Z
170 FOR Z=1 TO 10-J:A$(J)=A$(J)+" ":NEXT
Z
180 NEXT J
190 Q=DK
200 REM ** PRINT OUT **
210 CLS:SC=-1
220 B(0)=0:C(0)=0:D(0)=0
230 PRINT "AFTER MOVE";MV:PRINT
240 REM FOR NUMBERS ONLY, CHANGE NEXT LI
NE TO:PRINT B(0);" ";C(0);" ";D(0)
250 PRINT A$(B(0));" ";A$(C(0));" ";A$(D
(0))
260 FOR J=0 TO DK
270 REM FOR NUMBERS ONLY, CHANGE NEXT LI
NE TO:PRINT B(0);" ";C(0);" ";D(0)
280 PRINT A$(B(J));" ";A$(C(J));" ";A$(D
(J))
290 B(J+10)=B(J):C(J+10)=C(J):D(J+10)=D(
J)
300 IF D(J)=J THEN SC=SC+1
310 NEXT J
320 PRINT "-----
-----":REM DO FULL WIDTH OF SCREEN
330 IF SC<>0 THEN PRINT "SCORE IS"SC
340 IF SC=DK THEN PRINT "YOU'VE DONE IT
IN";MV;"MOVES":END
350 MV=MV+1
360 INPUT "MOVE DISK FROM WHICH COLUMN";
A
370 IF A<1 THEN END
380 IF A<1 OR A>3 THEN 360

```

```

390 INPUT "                TO WHICH COLUMN";
B
400 IF B=A OR B<1 OR B>3 THEN 390
410 REM ** FIND TOP DISK IN COLUMN **
420 E=0
430 FOR J=DK TO 1 STEP -1
440 IF A=1 AND B(J)<>0 THEN E=J
450 IF A=2 AND C(J)<>0 THEN E=J
460 IF A=3 AND D(J)<>0 THEN E=J
470 NEXT J
480 IF E=0 THEN 360:REM NO DISK IN THAT
COLUMN
490 REM ** FIND TOP SLOT TO PLACE DISK *
*
500 F=0
510 FOR J=1 TO DK
520 IF B=1 AND B(J)=0 THEN F=J
530 IF B=2 AND C(J)=0 THEN F=J
540 IF B=3 AND D(J)=0 THEN F=J
550 NEXT J
560 IF F=0 THEN 390:REM NO ROOM IN THAT
COLUMN
570 REM ** NOW MAKE MOVE **
580 REM ** FIRST REMOVE DISK **
590 IF A=1 THEN TEMP=B(E):B(E)=0
600 IF A=2 THEN TEMP=C(E):C(E)=0
610 IF A=3 THEN TEMP=D(E):D(E)=0
620 REM ** NOW PLACE IN NEW POSITION **
630 IF B=1 THEN B(F)=TEMP
640 IF B=2 THEN C(F)=TEMP
650 IF B=3 THEN D(F)=TEMP
660 REM ** NOW CHECK IF DISK BELOW IS LA
RGER **
670 OK=1:FOR J=1 TO DK-1
680 IF B(J)>B(J+1) THEN OK=0
690 IF C(J)>C(J+1) THEN OK=0
700 IF D(J)>D(J+1) THEN OK=0
710 NEXT J
720 IF OK=1 THEN 200
730 PRINT TAB(4)"=> THAT MOVE IS ILLEGAL
<="
740 FOR Z=1 TO 500:NEXT Z:REM ADJUST THI
S DELAY FOR YOUR SYSTEM
750 FOR J=1 TO Q
760 B(J)=B(J+10):C(J)=C(J+10):D(J)=D(J+1
0)
770 NEXT J
780 MV=MV-1
790 GOTO 200

```

Listing 1. The Tower of Hanoi program - not such a simple game.

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- * 4.77MHz Clock Rate
- * 640Kb RAM
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- * Composite Monitor
- * Serial, Parallel and Games Ports

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- * Serial, Parallel and Games Ports

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WORDS, WORDS, WORDS

WordStar 2000 Plus Release 3 and Microsoft Word Release 4

THIS MONTH I shall discuss two of the most recent word processor updates, WordStar 2000 Plus Release 3 and Microsoft Word Release 4. Both of these new releases are endowed with numerous enhancements of one sort and another, a surprising number of which are actually useful.

WordStar 2000

To give justice to the latest release of WordStar 2000 Plus I shall very briefly recapitulate the main features of its predecessor, Release 2, before passing on to the new release.

WordStar 2000 is not and was never intended to be an upgrade or new version of WordStar – its structure and its commands are completely different from those of 'traditional' WordStar (in other words, WordStar 3 and WordStar 4). In view of these fundamental differences, as well as the antipathy which traditional WordStar has attracted from the less enlightened sections of the computing fraternity, using the same name seems a curious marketing strategy – WordStar 2000, after all, was aimed at those who wanted a program which would be friendlier and easier to use than traditional WordStar, while still offering some of the power. However, MicroPro is now stuck with the name for good or ill.

WordStar 2000 is driven by control key combinations deriving from various menus, which may be suppressed or displayed according to the help level set. Many of the commands are mnemonic, although some of the associations seem a little far fetched. Nonetheless, the attempt at an easy command structure is more or

less successful and it is often possible for the learner or infrequent user to guess a WordStar 2000 command, a benefit found in few other programs.

The normal word processing functions are offered (mail merge, spell checking, indexing and so on), as well as key macros and a limited range of function key redefinition. Multiple document editing is supported, with up to three files being allowed. Document conversion is available to and from various formats. The program is, on the whole, reasonably powerful and easy to use, although it lacks the customisability which to me is the hallmark of a powerful word processor.

**If you need a full-featured,
heavy duty word
processor, the choice
between these two isn't
easy, as Keith Mackay
found.**

The latest release

Turning now to the new version of the program, WordStar 2000 Plus Release 3 (hereinafter Release 3) requires DOS 3.0 or higher, while earlier versions were happy with DOS 2.0. Release 3 is supplied on no fewer than 16 floppy disks, twice as many as Release 2. There are also three bundled 'companion' programs on five additional disks, bringing the grand total to 21. The old Plus disk, which was an optional extra with Release 2, is no longer

available, its features having been integrated with the package. The minimum memory configuration is 384 kilobytes, as against 256 Kbyte required for Release 2.

Installed in its full puissance with all its companion programs, Release 3 occupies 12 directories and accounts for over 4 megabytes of hard disk space. However, restricting oneself to WordStar 2000 itself, 3 Mbytes are needed; and if disk space is at a premium, dispensing with the tutorial and a few of the exotica – for example, conversion to and from IBM DCA format – will bring the requirements down to 2 Mbytes or so.

Release 3 can also be used, according to the manual, on a floppy disk only system. I did not attempt this latter piece of foolhardiness; and while it is undoubtedly true, I suspect that we are dealing with a statement of the type: 'You can ride a bicycle across the Simpson Desert'.

The documentation supplied runs to three substantial ring binders, one devoted to the three companion programs and one each to Learning and Reference. MicroPro documentation, by and large, is less than excellent – the WordStar 4 manual, for example, occasionally reaches a level of obscurity which might be envied by IBM itself. Release 3's manual, however, is a distinct improvement, being well organised and informative, and including a list of WordStar 2000 error messages and suggested remedies. An effort has clearly been made to cater for the difficulties of those approaching computers for the first time without insulting their intelligence – as I have said many times before, unfamiliarity with computers is not sign of cretinism, although the majority of software manual writers would appear to think otherwise.

Installation

Release 3 has one of the easiest and least painful installation programs I have yet come across. Setting the program up on the hard disk took only 15 minutes or so, and presented no great challenge to the intellect. Provision is also made for updating from Release 2, and a batch file is included for erasing program files left over from the older version. This batch file, of course, will not erase any files which have their read only attribute set, but although the manual hints at this fact it does not give any instructions on removing the attribute.

Having installed the program in full, I idly wished there were some sort of deinstallation facility; and once I had Release 3 up and running, I found just such a feature – any part of the program or its adjuncts can be reinstalled, reconfigured or removed altogether. This is vastly preferable to the heuristic approach to space saving – rummaging through directories and trying to figure out what can go; and discovering later that you've erased a screen driver or something equally vital.

Printer installation is carried out from the Additional Features Menu: there are over 400 on offer, ranging from the Epson GQ 3500 and the H-P Laserjet in various different configurations to the humble Backspacing Standard.

Release 3 is advertised as a 'word publisher', by which is meant that it includes a number of features more commonly found in desk top publishers. Printer support therefore goes further than this: up to 32 fonts are available and the PostScript page description language is directly supported. An additional program, PSFONT, allows PostScript definition files to be designed, and it is these facilities along with the program's graphic capabilities which largely constitute Release 3's 'word publishing' side.

The most obvious difference between the two releases of WordStar 2000 is in the Opening Menu: while Release 2 splits the available commands between two menus, Release 3 has done away with the second one – the commands which used to be there have either been included on the better organised single menu or have migrated to the Additional Features Menu.

Another very obvious difference is speed – while Release 2 is sluggish in pace, Release 3 is blindingly fast. The documentation claims a 370 per cent speed increase over Release 2 in locating text at the end of a file and 1060 percent (sic) increase in moving the cursor to the

C:\ws2000

O P E N I N G M E N U

Edit / create	Print	F1 Help
Speed write	Format design	Quit
Copy	Key macros	Directory / drive
Remove	List	Go to DOS
Move / rename	Telecommunications	
Organize files	Additional features	

Press a highlighted letter.

Figure 1. The Opening Menu in WordStar 2000 Plus Release 3, unlike Release 2, has one menu of commands.

Editing Settings Menu	
Beep on error	Location of system files
Color settings on monitor	Location of WS2000 files
Display of [COMMAND TAGS]	Menu display levels
European decimal point	Number of lines on screen
Fast Cursor	Print to disk format
Function keys	Printer pause
History Screen display	Submenu delay
Initial directory display	Return to Main Menu
Initial oertype	
These settings determine the editing defaults in WordStar 2000. They are not tied to a specific printer. See Appendix C, "Customizing WordStar 2000," for more information.	
Directions: Move the highlighting to the selection you want and press ←. Use the ↓ and ↑ keys or type the first few letters of the selection to move the highlighting.	
Esc = Main Menu	

Figure 2. The Editing Settings Menu from WordStar 2000 Plus Release 3 lets you change the default cursor speed, printer settings, help level and modify screen colours.

end of a file. I did not check these figures, but I am quite prepared to believe them. I did, however, carry out some informal tests on a 250 Kbyte file, produced by the repeated copying of a single sentence (and deliberately incorporating a typing error). Release 3 found its way from top to bottom of this file at a speed I could not determine without a stop watch and very fast reflexes – all but instantaneously, in other words. Since I was using Release 3 on an AT compatible running at 10 Mhz, I decided to install it on my elderly PC, which creeps along at 4.77 Mhz, and see how the speed matched up. And it was, of course, rather slower: moving to the bottom of the same file took at least two seconds.

On the subject of speed, one of the new features of Release 3 is 'Cruise Control' for controlling cursor speed, and I had

seen advertising to the effect that this option had been found necessary in order to hold the program in check. I had written this off as a piece of advertising hype, but once I set the cursor to its fastest speed (240 characters per second) I changed my mind – I don't think I have ever seen a cursor move at that speed before in any program.

MicroPro claims over 400 enhancements for Release 3. Clearly, I shall not be able to cover any more than a very few of them here. The list includes a thesaurus; a very sophisticated file finder which will allow conditional searching (find a file containing given text but not containing other text); improved format editing; widow and orphan control; new function key assignments and increased scope for programming function keys; a completely new context-sensitive help system; a

mouse-supported memory resident program which allows the incorporation of graphics and will capture screens from other programs ... and the list goes on.

A number of the improvements hinge on Release 3's greater customisability. Customisation is carried out by selecting Add New Feature from the Main Menu – this leads into the Editing Settings Menu, from which the default cursor speed can be changed, printer settings and screen colours can be modified, help level can be changed, and so on.

Although Release 3 remains far less customisable than programs such as Xy-Write or WordStar 4, it can be tailored to quite a considerable extent. Key redefinition in particular offers greater possibilities: any function key except F1, Ctrl-F1 and Alt-F1 can be programmed, as can Alt with any of the twelve keys along the top of the keyboard (1 to =). The Macro feature has been enhanced to allow macros up to 11 lines long, although this does not strike me as particularly generous.

An innovation associated with 'word publishing' is Page Preview, which gives a conceptual preview of a file, showing line and page breaks, line heights, column and graphics locations, headers, footers and footnotes as they will be printed. While this does not add up to anything approaching the capacities of dedicated DTP systems such as Ventura, it certainly sets a new standard for the printing capabilities of a word processor.

Touching finally on the three companion programs bundled with Release 3, Fill-a-Form, a product of Athena Software Corporation, provides templates for various types of form and also allows forms to be created. PC-Outline by Brown Bag Software is already well known as an outline processor of some power, allowing up to nine files to be used simultaneously; and Show Text, by TimeWare Corporation, is designed for the preparation of visual dis-

plays. The American Legal version of Release 3 supplies a fourth companion program, CompareRite, which allows any two legal drafts to be compared. This is not at present available in Australia.

MicroPro claims that Release 3 is more a totally reworked program than an update of an existing one. This claim is not an exaggeration – I had never regarded WordStar 2000 as a heavyweight, but the new release places it solidly in the power league. Those presently using an earlier release of WordStar 2000 will undoubtedly want to take advantage of the update offer, although the cost of upgrading to DOS 3 if necessary should be borne in mind.

Microsoft Word

I reviewed Word Release 3.1 in *Your Computer* May 1987, where I compared it with WordStar Version 3.3. As with WordStar 2000, I shall touch briefly on the program's main features before considering the new release.

Word is largely a menu driven program, with the menu occupying the bottom three lines of the screen. Options are selected by moving the highlight bar either with the Arrow keys or with a mouse. Word allows up to eight files to be edited simultaneously, although this can only be done by splitting the screen, which somewhat reduces its usefulness. Either text or graphics mode can be selected at any time. There is a sophisticated outline facility, and a thesaurus was introduced with Release 3.1.

Word's Gallery allows the use of style sheets, which govern margins, tabs and

general layout. Stylesheets may be designed to individual requirements, giving a high degree of control over print formatting – the Norton Guides manual, according to a note at the back of that publication, was prepared using Word version 3.1.

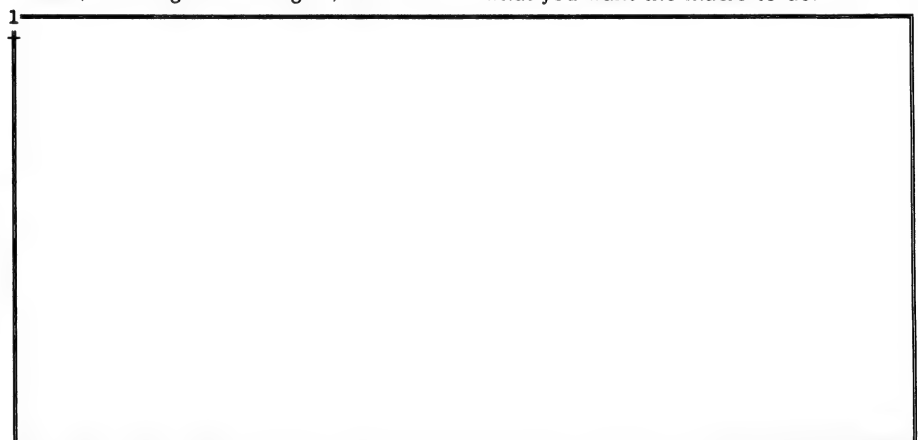
In general, as I observed in my earlier review, there is very little that is not available: all the standard word processing features are included, including mail merge, spell checking, file conversion, footnoting, indexing, Math and so on. A certain amount of on screen help is available, but this is at best cursory and at worst cryptic.

Word Release 4 (to be known here as Release 4) is a far less space hungry creature than the new version of WordStar 2000. It is distributed on ten floppies, including three devoted to tutorials and one containing a bundled version of Les Stein's program Envelope. Fully installed, it requires the best part of 2 Mbytes of hard disk space, but without the tutorials or Envelope the space needed drops to a little over 1 Mbyte. Word can be used on a floppy disk only system, but a hard disk will, of course, give better results. The program requires 256 Kbytes of RAM and runs on DOS 2.0 or higher. A mouse is preferable with all versions of Word, but it can be run perfectly well without one.

Release 4's documentation consists of two slim spiral-bound volumes dealing with reference and printer data, the manual for Envelope, and one 500 page ring-bound manual, as well as sundry small pamphlets. In general, the documentation is well written and well organised, although it does feature the occasional piece of excruciating pedantry such as Step 1 in Creating a Macro – 'Decide what you want the macro to do.'

Product Details

Product: WordStar 2000 Plus Release 3
From: MicroPro, USA
Distributor: WordStar Australia, 44
Chatswood Village, Chatswood 2067
NSW
(02) 411 7255
Price: \$227 without companion
programs
\$700 Personal Edition
\$323 upgrade (full package including
companion programs)
All prices taxed



COMMAND: Copy Delete Format Gallery Help Insert Jump Library
Options Print Quit Replace Search Transfer Undo Window

Figure 3. The editing screen menu from Microsoft Word Release 4. The Escape key toggles between the document and the menu.

Installation

Installing Word on a hard disk remains a simple matter, taken care of by a set up program which also handles printer selection. The range of printers offered runs to 92, of which the 92nd is 'other', a basic printer driver. Most laser printers are covered, including the H-P LaserJet in a number of different configurations. Word has never allowed itself to be customised to any extent, and Release 4 continues this tradition, customisation being virtually confined to disabling the menu display and dispensing with the borders which enclose the text.

There are overall fewer enhancements in Word Release 4 than in WordStar 2000 Release 3, which probably reflects a different starting point: Word has been through numerous recensions over the four years of its existence, and has gradually incorporated a wide range of features, although in my own view it was not until Release 3.1, which immediately preceded Release 4, that the program became all usable.

As with Release 3 of WordStar 2000, the first difference to be noted in the new Word upgrade is in the menu, which has abandoned the wearisome Alpha command – the Esc key now toggles the menu on and off, which is a much more convenient way of going about things.

The function keys are now used in all their 40 combinations, although the AT F11 and F12 keys have only two assignments each.

There is a very conspicuous increase in speed – I found version 3.1 very sluggish, but Release 4 found its way from top to bottom of the 250 Kbyte test file virtually immediately. Cursor speed control is featured also, the maximum setting being rather slower than that of WordStar 2000 Release 3 but still showing a marked improvement over earlier versions.

A macro processor is indispensable in a fully featured word processor, but until Release 4, Word was the only package at this end of the market which did not offer one. This deficiency has now been remedied and perhaps constitutes the most significant addition to the program.

Release 4's macro processor stores macros in a glossary file; and unlike many other programs, it allows its macros to be edited – WordPerfect, for example, requires a separate macro editor to be bought for this purpose, and WordStar 4 will not allow it at all.

A macro can be created in either of two ways: by entering macro mode and recording the required keystrokes; or by writing the macro as a text file, using symbolic

Path: C:\WORD\
C:\WORD\README.DOC

C:\WORD\WORD_DCA.DOC

UPDATE SUMMARY filename: C:\WORD\README.DOC

title:	version number:
author:	creation date: 9/17/87
operator:	revision date: 9/17/87
keywords:	
comments:	

Enter full filename or press F1 to select from list
DOCUMENT-RETRIEVAL

Microsoft Word

Figure 4. Word now has a document summary facility that can be used to trace the history of a document or for retrieval.

representations of the keystrokes and commands, and then saving it to the glossary. Macros can be nested, and can be designed to pause for keyboard input. Comments can also be included within macros. Conditional macros can be built using IF, WHILE and ELSE statements.

A macro is played back either by selecting Insert from the menu and pressing F1 to select a macro or by typing the macro name and pressing F3 to play it back. Release 4's macro processor seems to be designed chiefly for lengthier tasks: there are too many keystrokes involved to use it simply for frequently used words.

Spreadsheet linking is another new feature of Release 4: a spreadsheet from 1-2-3, Multiplan or Excel can now be incorporated into a Word text file without the need for any special conversion. Spreadsheet linking can be confined to a specified range of cells or may use the entire spreadsheet. Spreadsheet data can also be imported into a separate window and moved or copied as required.

Word is now able to print line numbers in a file, which will be of interest, perhaps, to academic and legal users.

New features

Document history has been introduced, a feature often found on programs aimed at the corporate market, permitting easy identification of the author and word processor operator concerned in the creation of a given file.

The document history can be used, of course, in retrieving files – the keyword field in particular has considerable potential here.

Style sheets can now be created much more easily by simply copying the current set up as a style sheet. This also means

that a style sheet can be modified much more easily. It is also possible to search for formats, using either style sheet codes or format characteristics and also to replace given settings.

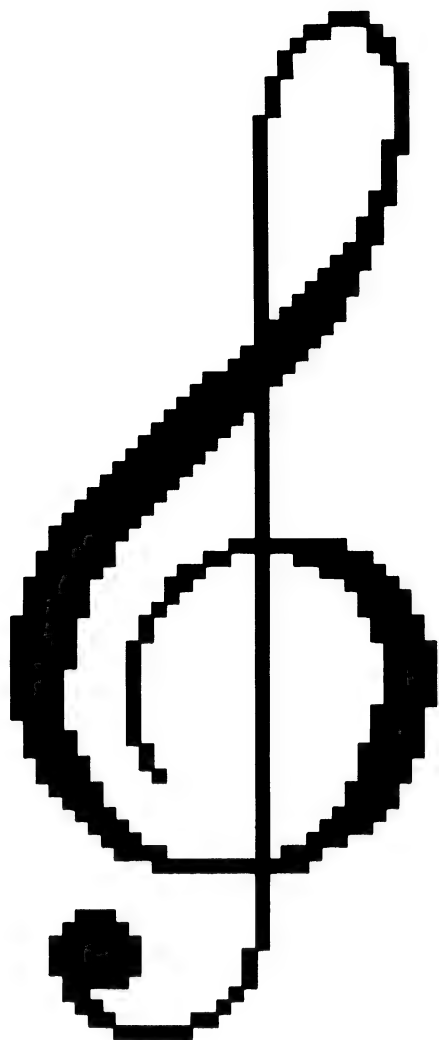
There are certainly enough new features here to warrant a major release number; and the very reasonable upgrade price should attract existing Word users. Word is a program which, although I am aware of its power, I have never liked using because of its awkward menu driven structure and its slowness. However, with the greatly enhanced speed of the new release and the deployment of the full range of function keys, Word finally seems to have got its act together. Until the next fad in word processing features arises, the only thing Word now lacks is customisability.

Product Details

Product: Microsoft Word Release 4
From: Microsoft Australia, 1 Skyline Pl,
Frenchs Forest 2086 NSW
(02) 452 0288
Price: \$904 taxed;
\$175 Upgrade (no tax)

In summary

As far as new users are concerned, these two programs now offer a broadly similar range of capabilities, and both should be considered by anyone in the market for a fully featured word processing package. Word, of course, carries a considerably higher recommended retail price than WordStar 2000 Release 3, although the street price for both programs will undoubtedly be substantially lower. A choice between the two is one I would find extremely hard to make. □



Microcomputers, MIDI and Music

We've covered voice and mode channel messages, now Andrew Symaniz moves on to system messages.

Unlike channel voice and mode messages, system messages do not include channel numbers encoded within their status bytes. Since they are not related to individual MIDI channels, system messages can be deployed to provide synchronisation and other information intended for all devices connected in a MIDI system.

As can be seen from Table 1, system messages may be further subdivided into three main groups according to function – system real time, system common and system exclusive.

System real time messages

System real time messages provide the timing data necessary for synchronising drum machines, sequencers and other peripheral equipment to the source 'clock' on a master unit.

Of course, most sequencers incorporate their own internal timing mechanisms which enable them to be programmed separately. But auxiliary sequencing devices in a system need to rely on a common timing reference – at least during the final stages of song construction – if everything is to remain tightly in sync.

System real time codes are all single-byte messages, hence do not contain associated data bytes. They can be transmitted at any time – and their 'hi-priority' status enables them to be interspersed between component bytes comprising other MIDI messages.

Since most other multi-byte MIDI instructions are interruptible by system real time messages, timing precision (in particular, the transmission of F8 timing-clocks) is not compromised.

Typically, system real time F8 timing-clocks are transmitted by a master sequencer at a rate of 24 clock 'ticks' per quarter note, or crotchet. The actual trans-

mission rate is relative to the variable tempo changes programmed on the master sequencer.

Normally, F8 timing-codes are completely ignored by a peripheral sequencing device – until either an FA 'start' or FB 'continue' message has been received. The FA code restarts an external sequencer from the very beginning of the sequence each time it is received. The FB code enables some devices to continue on from wherever the sequence was last stopped. To stop a running sequence, the FC 'stop' code is sent down the MIDI bus.

The FE code is optional – sent periodically by some MIDI transmitters so that connected receivers can 'sense' the transmitter is still active and plugged in. Once this message has been received, most devices expect to continue receiving FE or other MIDI messages – usually at a rate faster than once ever 300 ms. In the absence of any further activity on the MIDI bus, the receiver should automatically revert to standalone operation.

Depending on manufacturers' individual implementations, the FF 'system reset' code may be used. Its function, according to the original *MIDI 1.0 Detailed Specification* document, is to 'initialise the entire system to the condition of just having been switched on.'

In practice, however, strict interpretation of this aspect of the MIDI spec may not be particularly user-helpful. A 'cold start' system reset would destroy all unsaved sequence data in memory, for example, and perhaps even require re-booting of sequencing software.

What's more, automatic transmission of 'system reset' (say, as part of the power-up routines of several devices connected back-to-back) can create a situation where instruments endlessly reset each other when they're switched on!

IN THE LAST last two articles in this series we looked at two kinds of MIDI channel messages – voice and mode. To recapitulate: voice messages can be sent over any of 16 discrete MIDI channels to address one or more remote units in a system whose channel assignments match the channel numbers encoded in the status byte. The relationship between the 16 available MIDI channels and a particular instrument's internal voice-assignment algorithm is defined by mode messages, sent over an instrument's basic channel.

System messages

Channelised MIDI instructions (status bytes 8N, 9N, AN, BN, CN, DN, EN) carry most of the routine performance information. In more temporally-dependent composition situations, however, channel messages may be supplemented by another set of MIDI instructions called system messages. These are easily distinguished from channel messages since they contain status bytes with all four most significant bits set to 1 (status FN).

System common messages

Initially, system common messages were intended as a class of instructions that could send a variety of setup information to various kinds of MIDI equipment on line. The F3 Status message can choose between songs or sequences, numbered 0 to 127. The F6 message is used with analogue synthesisers to request automatic oscillator tuning.

In more comprehensive sequencing situations, F2 song position pointer messages, transmitted by the master sequencer, can be used to arbitrarily preset the song position registers of external instruments. In this way, several peripheral machines can keep track of what the master machine is doing – for synchronised playback and recording. Unfortunately, few affordable instruments have implemented the song position pointer feature.

But for those that do: upon receipt of a 'start' command, the song position register resets to zero, then automatically increments after every sixth 'timing-clock' received. Since this register is closely related to other System Real Time commands such as 'continue' and 'stop', it enables the musician to commence or cease playing and recording sequences from specified points in a song.

Onscreen song position displays provide a running count of the number of 16th notes (semi-quavers) elapsed since the beginning of the song. But unlike ABSOLUTE 'time-of-day' SMPTE-styled timing references, song position pointer readings simply measure cumulative chunks of time (usually shown in 'beats', where 1 beat = 6 timing-clocks) relative to changes in the sequencer's instantaneous playing tempo.

In the original MIDI 1.0 specification, the F1 code was not specifically defined. Subsequent enhancements to MIDI by the MIDI Manufacturers Association (MMA) and the Japanese MIDI Standards Committee (JMSC) have now made available a 2-byte F1 status instruction called quarter frame messages.

Quarter frame instructions are somewhat similar in action to the ubiquitous F8 timing-clock codes, although F1 messages exhibit considerably finer timing resolution and a number of other more flexible options. For example, groups of quarter frame messages can be administered to convey absolute SMPTE time within more 'visually-cued' music composition environments – such as in film or video soundtrack work.

We'll examine F1 quarter frame mes-

sages in greater detail in a future article – when we'll be investigating one of the more recent and promising extensions to MIDI Time Code.

System exclusive messages

By far the most generalised command structure built into the original MIDI specification is the system exclusive or SysEx message mode.

This wide-open MIDI programming area allows individual manufacturers to devise their own communication protocols to perform functions not specifically defined by channel voice, channel mode, system common and system real time messages. A virtually unlimited variety of more standardised universal system exclusive formats may also be contrived, to provide specialised protocols for different classes of equipment, or future applications.

Recent logical extensions to the initial SysEx shell have given rise to four distinct

Message	Status	(ID/Header)	Data
EXCLUSIVE			
Manufacturer Specific	F0	(manufacture-ID)	data,,,data
Universal Non Commercial	F0	(7D)	data,,,data
Universal Non Real Time	F0	(7E, d, s1,,,sn)	data,,,data
Universal Real Time	F0	(7F, d, s1,,,sn)	data,,,data
COMMON			
Quarter Frame	F1		message
Song Position	F2		LSB, MSB
Song Select	F3		Song
Undefined	F4		
Tune Request	F6		-
'End of SysEx': (EOX)	F7		-
REAL TIME			
Timing	F8		
Undefined	F9		
Start	FA		
Continue	FB		
Stop	FC		
Undefined	FD		
Active Sensing	FE		
System Reset	FF		

Table 1. All four system exclusive formats are distinguished by unique identification codes in hex and header structures.

Manufacturer	ID Number
Sequential Circuits	01
Octave Plateau	03
Moog	04
Passport Designs	05
Lexicon	06
Kurzweil	07
Fender	08
Ensoniq	0F
Oberheim	10
J L Cooper	15
Lowrey	16
E-mu Systems	18
Harmony Systems	19
Art	1A
Baldwin	1B
SIEL	21
Synthaxe	22
Hohner	24
Solton	26
Jellinghaus Musik System	27
PPG	29
Elka	2F
Kawai	40
Roland	41
Korg	42
Yamaha	43
Casio	44
Kamiya Studio	46
Akai	47
Japan Victor	48
Meisoshsa	49

Table 2. Manufacturer-ID numbers are allocated to registered manufacturers via the MIDI Associations. These hex codes cover a manufacturer's entire MIDI product range.

categories of system exclusive. These are called: manufacturer specific, universal non-commercial, universal non-real time and universal real time.

As briefly summarised in Table 1, all four system exclusive formats are distinguished by unique identification codes and header structures. All SysEx information is terminated either by the F7 'End-of-System-Exclusive' (EOX) flag, or any other status byte except real time codes F8 to FE.

Universal SysEx format

The value of the byte which immediately follows the F0 'start-SysEx' command is reserved for the three universal SysEx formats (non-commercial, non real time and real time) – either 7D, 7E or 7F respectively.

Universal SysEx headers may incorporate other specifications – for example, values for addressing particular devices within a system, and sub-ID codes which identify several different types of message.

Any number of data bytes can follow the sub-IDs, and the specific data structure is dependent on the Particular message that the sub-IDs define. We'll consider universal real time and non real time SysEx data

in more detail when we look at individual applications.

At present, no specific universal non-commercial messages have been formally defined by the MMA and JMSC. This format has been set aside for use within schools, research facilities and so on – where it is unlikely the equipment designed and built inhouse will be used with equipment from similar organisations.

In research situations, unique IDs may not be required, so the universal non-commercial proposal should at least prevent inhouse applications (MIDI-to-satellite anyone...?) from interfering with commercial equipment.

Manufacturer specific SysEx format

An enormous variety of commercial software incorporating manufacturer specific features has been available for quite some time. Only devices which recognise a manufacturer's individual SysEx formats can attend any information exchange. For example, if the number F0 (start-SysEx) is followed by 43 hex (the code for Yamaha Products) any following instructions will be listened to only by Yamaha machines.

Manufacturer-ID numbers are allocated to registered manufacturers (for a price) via the MIDI Associations. These codes (see Table 2) generally cover a manufacturer's entire MIDI product range. Any additional information or operating parameters required for System Exclusive communication are usually included within the SysEx data field.

Any kind of data, in whatever amount needed, can follow the manufacturer-ID code – it's strictly up to the manufacturer to decide what to do with this capability. Manufacturers have always been encouraged to publish detailed explanations of what various SysEx codes will do (sometimes this appears in the owner's manuals), to enable third party developers to make use of them as well.

The primary use for SysEx commands, until recently, has been for factory designed functions such as data transfer and remote parameter control. Unfortunately, many musicians remain unaware of the creative potential implied by the existence of these messages.

Next time, we'll investigate some 'real world' applications of system exclusive programming. □

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Address:

Phone: Computer:

Send more info.	Pay-Pack <input type="checkbox"/>	Cross-Cheque <input type="checkbox"/>	Cash Flow <input type="checkbox"/>	Letter Magic <input type="checkbox"/>
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Amy's First Primer and Word Processor for Kids

AT A RECENT MEETING of the IBM Education User Group at Caulfield Secondary College in Melbourne, members were sharing their favourite Public Domain software. It's a sign that there's something right about the two programs under review that several people turned up with one or both of them to share.

All were primary teachers and all reported the success with which their students use Amy's First Primer and the Word Processor for Kids on their IBM IXs. Both programs run on IBM PCs and compatibles (with turbo turned off) under PC-DOS (MS-DOS) 2.0 and later; both require a CGA card. There is a special (in fact the original) version of Amy's First Primer for the IBM IX which utilizes the IX's improved CGA card to allow the use of 16 foreground colours (rather than the usual 4). The resulting graphics are stunning and delight the young users.

Amy's First Primer

This Basic program was written in 1985 by Rob Robinson for his four-year-old daughter. The program is started by entering BASIC COPYRIGHT which brings up a copyright notice where we learn that Amy's First Primer (simply Amy from now on) is recommended for children from four to eight years old and is intended to help them learn the alphabet, the numbers from 1 to 9, problem solving skills and pattern matching.

I'm sure many parents and teachers will be delighted enough with the program to send the requested \$US15 to the author. In return they will receive both a good feeling from having helped to foster the Shareware concept along with the Draw program used to create Amy's excellent graphics.

Here are two more Public Domain programs aimed at young kids. As Brian Davey of AMSEC reports, no one with that fatal combination of a PC and children should be without these two excellent and affordable programs.

Amy begins with a menu from which the child may choose one of six games. The name of each game is listed along with some simple graphics to remind a non-reader what each game is about. To reinforce elementary keyboard skills, the up/down arrow keys control a large arrow on the screen which moves from name to name and a game is selected with Enter. The six games are the ABC Song, Beary Fun Letters, Bunny Letters, Beary Fun, the Froggy, and Load The Truck. At any time the child may return to the menu by pressing Esc.

The first 'game' is very simple. The familiar ABC song is played slowly while the upper and lower case letters appear

on the screen with an icon depicting a object beginning with that letter – Apple, Boat, Car and so on. It ends with the words 'Now I've said my ABC'S. Will you come and play with me.' across the top of the screen. The incorrectly used apostrophe (an American-ism) at the end of ABC may be edited out (lines 870, 1470 and 1780 in ABC.BAS, BEARABC.BAS, and BUNNY.BAS, respectively.) The child is simply intended to sing along.

Alphabetic keyboard tutor

Beary Fun Letters is a kid's alphabetic keyboard tutor. An icon flashes on the screen followed two seconds later by its upper and lower case letter. The child then has unlimited time to press the corresponding key. As with all the other games, there is no negative reinforcement, an incorrect key selection yields no reaction. After the correct key is pressed a bear's face appears on the boarder of the screen and another letter is prompted. After 28 randomly generated letters the ABC song plays and the game starts again.

In Bunny Letters the screen has four icons down the left side and the corresponding letters in a random order down the right side. The four arrow keys move a rabbit which must drag a line from the icon to its letter. After all four are connected a bunny appears at the top of the screen and four new icons appear. Once 20 icons and letters have been joined, the ABC song plays again and the game recommences.

Beary Fun Counting is a straightforward counting and number recognition game. A number of pieces of fruit (randomly chosen numbers between 1 and 9) appear on the screen and the child must count them then press the corresponding number key. A bear's head then appears on the boarder of the screen. After 28 numbers 'Yay. You did it.' appears and the game is repeated. At the beginning of Help The Froggy we find a

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frog at the start of a maze while 'Froggy went a courtin'' plays. Using the arrow keys we guide the frog to the lily pad at the end – a fly then flies near the frog, out goes a tongue, the frog licks his lips and the fly is no more. The game begins again with a new maze.

The final game, Load the Truck, is one of the most popular due to the impressive combination of graphics and sound effects. In a rectangle is a collection of four shapes chosen from squares, diamonds, rectangles, triangles and ovals. The child uses the arrow keys to drive a front-end loader around the screen to collect these shapes in the correct order and deposit them on the back of a semi-trailer. Once this task is complete the front of the truck backs up to the trailer and then drives off the screen with its load. We then begin over again with a new collection of shapes. The younger kids at the Hurstbridge Learning Co-operative Primary School, where I'm the computing coordinator, really enjoy this disk. The games are short, simple and colourful which along with the ability to escape at any time makes them just right for short concentration spans. Although the older kids sometimes play them, the games lack the challenge older children look for. I recommend this disk highly for children aged three to six.

It's worth mentioning in passing that the Basic programming on these disks is clear and well annotated. A comparison of the programs on the PC and IX disks provides a good lesson in Basic programming for the IBM IX. My only criticism of the IX version is that the tunes use only one voice rather than using all three available. One day when I've got a spare hour (or two) I'll add the other two voices myself – perhaps a musically and *Basically* inclined reader will do it for me – any offers?

Word Processor for Kids

Long after children have tired of drill and practice programs such as Amy, they will still be using the Word Processor for Kids (WPK for short). WPK was developed in 1984 by S. Nolte and B. Thompson because they felt that more than any other program, a word processor could do much to help children learn to communicate through the written word. They also believe that adult word processors are too complex for young children while the usual screen fonts are too small.

Accompanying the program is a file containing eight pages of documentation. It begins with a discussion of the philosophy behind WPK, goes on to explain for computer novices how to make a backup copy and then explains in detail how to use the program. All the essentials are covered, from what a cursor is, how to use

a menu, how to actually write a story then print or delete it, through to the active word processing keys and options available such as screen colours and 20 or 40 column display.

The authors suggest that the program would probably sell for around \$US30 (I think it would be more), and ask for a

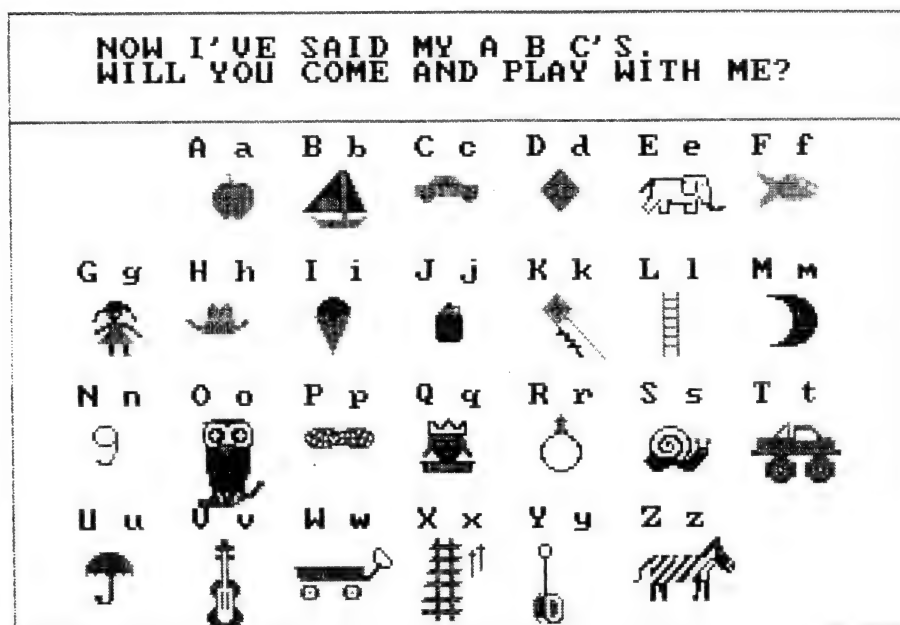


Figure 1. While the ABC song plays slowly, upper and lower case letters appear with an icon depicting a object beginning with that letter. The incorrectly used apostrophe at the end of ABC may be edited out.

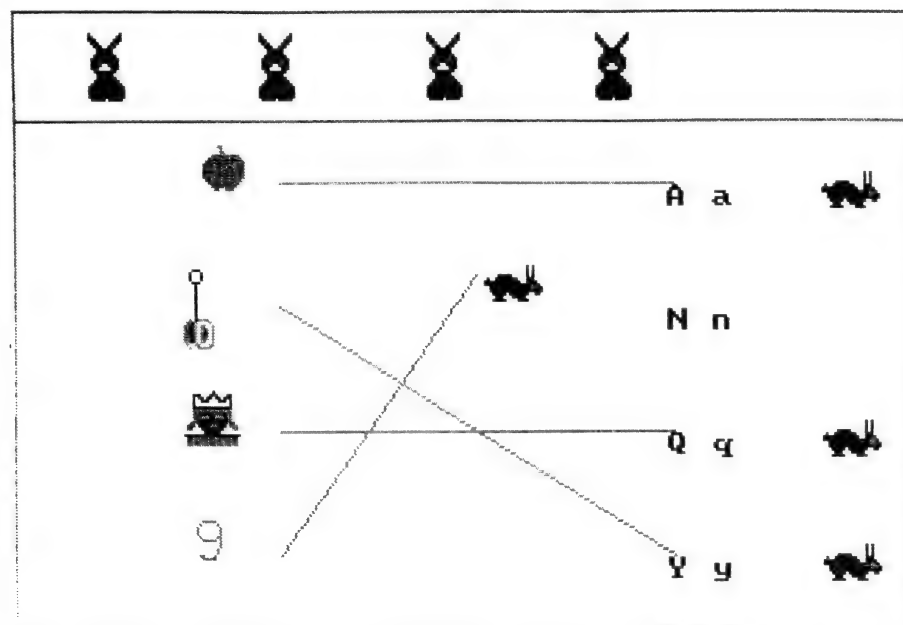


Figure 2. In Bunny Letters, the four arrow keys move a rabbit which drags a line from the icon to its letter.

donation of \$US10 if you find it useful. If all the parents and teachers who find this program useful send in their money, Messers Nolte and Thompson will be rich – it's a beauty!

The program begins with the familiar ABC song and the letters appearing around the screen. As soon as Enter is pressed the main menu appears. The choices, each with an appropriate icon, are Help, Write, Library, Print, Delete and Quit. When Help is chosen a straightforward explanation of the cursor, the arrow keys, the special keys (Esc, F1, F2, and F3) and the editing keys (Ins and Del) appears spread over three screens. Help may be obtained at any time by pressing F1. F2 cycles through four choices of screen colours – white on blue (the default), brown on black, white on red, and white on black. The size of the screen font may be toggled via F3. In the original version of WPK, Ins and Del were the only editing keys.

My children can't have been the only ones who complained about the Backspace being disabled. To their delight, Backspace works as usual in the new version though an explanation has not been added to the help screens. Esc returns you from the help screens back to your text and from your text back to the main menu, automatically saving it to disk in the process. The other choices on the main

menu are self-explanatory. Library, Print and Delete each lead to a directory of the *.WPK files available from which we may choose one to edit, print or delete respectively. Write leads to a further two-choice menu: Old or New. Write followed by Old is equivalent to choosing Library and allows editing of old files. After choosing New we enter an alphanumeric title of up to eight characters (the extension .WPK is added automatically when the file is saved) and are presented with a blank screen except for Page Number and Insert On indicators at the bottom. If you accidentally enter a name which already exists, the existing text is not over-written but appears on the screen.

Wordwrap is automatic, which means that if a word threatens to start on one line and end on the next then the program moves the whole word down to the next line. The default screen is a 20 column one with a special font designed by the authors. This is great for young kids as it is four times the size of the 80 column screen used by most word processors. The screen may be toggled between the special 20 column font and the usual 40 column font via F3. For small files, the size that children usually create, this change is almost instant.

I discovered that the program will accept any ASCII file with the extension

WPK, though non-alphanumeric characters can lose a little in the translation. In this way I imported a large file which was 12 WPK-pages long: it took a minute to get the text onto the screen and nearly as long to change it from one font to the other. This is an unfair test as WPK is intended for beginning writers who are more likely to write 12 lines than 12 pages. Nevertheless the trick of creating a file on another word processor and then importing it to WPK may be useful to some parents and teachers.

When a file is printed it takes up the middle 40 positions of an 80 column page. Text saved in the 20 column format is printed using the printer's expanded (40 column) font while text saved in the 40 column format is printed using the usual (80 column) elite font.

As I said before, this program is a beauty. My sons still use it, though after using WPK for a while, Evan, the older, began to see for himself the need for enhancements such as cut-and-paste and he has now graduated to using PC-Write, my favourite word processor and another Shareware product.

Availability

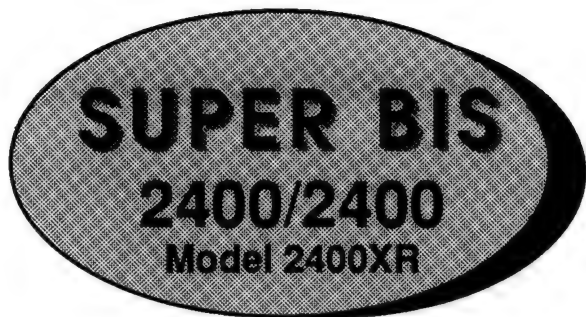
All three disks discussed here are Public Domain and so may be freely copied. They may be picked up on bulletin boards or from one of the many distributors of PC-SIG disks. A little care is necessary though. While the PC version of Amy is easily found, the JX version is not always available. More importantly, most distributors have copies of the original version of WPK and not the new version. Apart from the fact that Backspace is disabled in the old version of WPK, it also has a bug which has been fixed in the new version: sometimes when you flip from 20 to 40 column mode and back, part of the text disappears never to be seen again. □

Evan(8) and
love the Kid
Wordprocessor
especially in
backspace wo

Figure 3. The authors of WPK designed a font for kids – it's four times the size of that used by most word processors.

Product Details

Product: Amy's First Primer (PC version: PC-SIG Disk 646; JX: PC-SIG Disk 647) and Word Processor for Kids, New Version (PC-SIG Disk 343)
From: Public Domain Shareware
Distributor: SME Systems, 22 Queen Street, Mitcham, 3132 Vic.
(03) 874 3666
Price: Available to members only: yearly membership (including Public Domain Catalog) \$30 plus \$5 per disk (over the counter), \$6 per disk (mail order, including postage)



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IBM's PS/2 Model 80

... an enigma

IHAVE JUST the last few weeks with an enigma, the IBM PS/2 Model 80. Not an enigma because of its performance, or its price, but because the definitive piece of software that makes it a true 80386 computer has yet to be released. In the meantime it is a very powerful and competent 386, overall built like a tank but with a few odd fragilities and incompatibilities.

Before I start to describe the appearance and performance of the unit tested, a brief statement of its specification is in order. It was an IBM PS/2 Model 80, with 80386 microprocessor, 2 megabytes of RAM, a single 70 Mbyte hard disk, and was fitted with the 8514A VGA plus adapter card and a 8514 colour monitor. It had the now familiar IBM Enhanced keyboard and the new two button PS/2 mouse.

System unit

The Model 80 is a 'tower' machine rather than a desktop, with the system unit designed to be placed vertically on the floor under a desk. The shell is 600 mm high, 480 deep and 165 thick, cast in metal and finished in a warm grey textured enamel. The left side consists of a removable panel, with a lock at the top and two screws, each with a slot allowing them to be loosened or tightened with a coin, halfway down. On the inside of this panel are various pieces of soft foam and ducts to direct air flow to vital parts when the machine is in use. The system unit weighs in at 18 kilograms, but as it has a strong metal handle at the top, running from front to rear and pivoting to stow neatly away, it is quite easy to move one handed. Two feet on the bottom can be turned 90 degrees to make the unit quite stable on the floor, or can be returned to the rest position for transport.

The front, from the top down, has a panel with the power on/off switch and indicator lights for power and hard disk activity. Below it is the 1.44 Mbyte 90 mm

John Hepworth found the PS/2 Model 80 an enigma – the definitive piece of software that makes it a true 80386 computer has yet to be released.

floppy drive, and beneath that is a blanking panel over a spare slot for a second 90 mm floppy. Moving down once again, there is a panel about 100 by 160 mm which covers the mounting sleds for the hard disk drive(s). At the very bottom of the front panel are the slots ventilation.

Moving to the rear we find, again from the top down, the power inlet with the fan outlet beside it. Below it are the keyboard connector and mouse connector, both miniature DIN sockets and to my mind a little fragile, a DB25 female parallel port and a DB25 serial port. A 14-pin video connector for VGA output comes next. The test machine had the 8514A Display Adapter card fitted to give better-than-VGA performance, and a video connector on this card was used instead of the motherboard video connector. Beneath all

these ports are the metal covers for the eight expansion slots. No switched power outlet was fitted for supply to monitors and similar peripheral devices.

The X-ray

Looking inside is very revealing. The first thing seen is the power supply, which runs from front to rear at the top of the case. The power supply has a very sturdy shell and a very large fan. The mother board receives its power via a large plug permanently wired to the power supply by several insulated conductors. In addition, the power supply has two four-conductor DC outlets for supply to the hard disk drives. On the machine tested, one was used for the installed drive, while the second was a spare for a second drive, should it be fitted.

At the front of the machine, the power supply is only half the height that it is in the rest of the machine. The top floppy disk drive nestles in a sturdy rack in this area. If a second floppy drive is required there is space and signal cable waiting for it. Below the power supply and floppies are the sleds for two hard disk drives, one facing to the rear of the machine and one to the front. On the test machine, a single 70 Mbyte drive was fitted in the rear position. Sturdy metal clamps fitted with large thumbscrews secure the drives.

The motherboard is simply enormous. It is about 280 by 400 mm, crowded with tiny surface mounted integrated circuits of various types. A socket is provided for a floating point mathematics co-processor, though the test machine did not have one. Two daughterboards are fitted at right angles to the top of the motherboard, between the hard disk drives and the power supply. On the test unit these carried 2 Mbytes of 32-bit RAM.

The speaker was mounted low down at the front of the case, near the ventilation inlet slots. The battery was mounted on the speaker support.

AMSEC

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Slots and boards

Beneath the drives is the space for the eight expansion slots. Three appear to be 32-bit, four 16-bit, while one is a 16-bit slot with an extended connector apparently intended for special video boards. In the top slot (a 16-bit slot) was the hard disk controller, and examination of it and its cables indicated that it should be capable of controlling two hard disks. None of the other slots were filled.

I did feel a little uneasy about possible fragility of the slots and the board mountings. The edge connectors fitted to the motherboard, and into which the expansion boards are plugged, have strong enough plastic mouldings, but the vast number of connections within each seems to be very finely made and rather demanding in tolerance.

They probably will be alright, but the actual support for expansion boards would worry me if the machine was to be transported with expansion boards in place. When an expansion board is plugged in, the rear engages with the back panel at two points and is held by a small knurled knob. The front of the board merely sits in a notch in a rib in the case, and the board could do a fair bit of twisting and moving if the case was vibrated.

Video

Like all the PS/2 range, the Model 80 can drive a range of analog monitors with impressive performance, using video chips on the motherboard. On the test machine, even greater video performance was available as an 8514A Display Adapter card was fitted to that special expansion slot. It consisted of two printed circuit boards piggybacked together on one set of carrier handles, and connecting to one slot. The full size daughter board on the 8514A did overhang and block the adjacent slot.

An 8514 monitor came with the test unit. It has an enormous, high resolution colour screen, and the actual image area is no less than 300 mm wide by 220 high. The monitor case is recessed behind the screen surround, and then tapers slightly towards the rear. The power switch was hidden behind the right side of the screen surround and the contrast and brightness controls behind the left part of the surround.

A standard power inlet socket was fitted to the underside near the integral swivel base. The video input lead was permanently fitted to the monitor, and at 1.75 metres long it allowed the system unit and the monitor to be easily located in con-

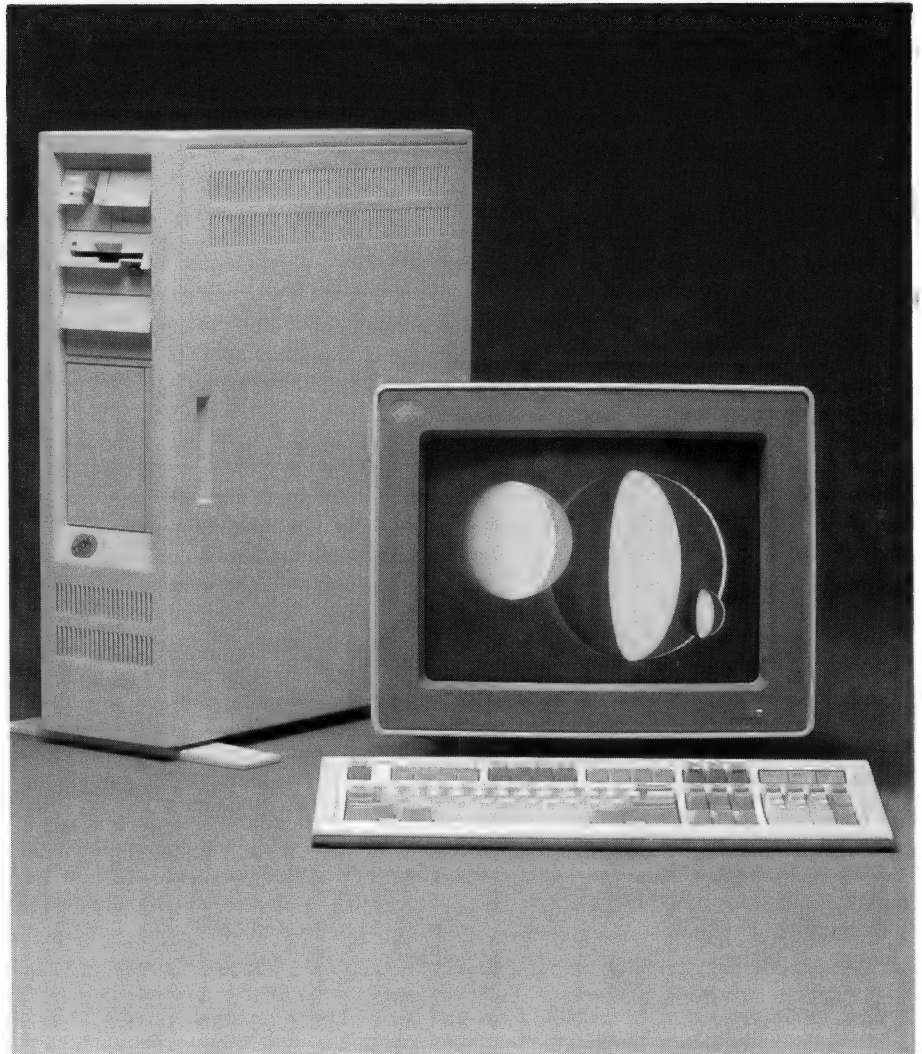


Figure 1. The front of the Model 80's tower, from the top down, has a panel with the power on/off switch and indicator lights for power and hard disk activity. Below it is the 1.44 Mbyte 90 mm floppy drive, and beneath that is a blanking panel over a spare slot for a second 90 mm floppy. Below that is a panel which covers the mounting sleds for the hard disk drive(s). The test unit was supplied with a high resolution 8514 monitor, which has an image area of 300 x 220 mm. The Model 80 is supplied with the IBM Enhanced keyboard.

venient places. I have reservations about the connector at the system unit end of the cable, as it has a multitude of fine pins, and even with very careful use, one did become misaligned at one time and required surgery to straighten it.

Video performance is simply stunning, with either purpose written VGA programs or others like Windows 386. As with all the IBM VGA boards, some badly behaved graphics programs written for CGA or VGA don't always work as expected, though all text and the vast majority of graphics programs worked well.

OS/2

The system came with OS/2 installed on the hard disk. Booting the Model 80 without a DOS disk in the floppy drive loaded OS/2 instead of DOS. On very rare occasions one might need to use DOS, so as to run a program which would not run from the DOS prompt within OS/2 and demanded 'real' DOS. In such cases one merely booted from a DOS floppy, as the hard and floppy disk formats for DOS and OS/2 are the same.

Under OS/2, as configured on the test machine, an opening screen showed two

lists of programs. In the left column was a list of available OS/2 programs which could be run from the menu, while the right column showed the OS/2 programs which were running. One OS/2 program which is always running is labelled on the menu as DOS Prompt. It has been nicknamed the Compatibility Box, and selecting it allows DOS programs to be run from within OS/2. In the remainder of this article I will refer to DOS when talking about programs running directly under DOS 3.3, about the Compatibility Box when talking about running DOS programs within the DOS emulator of OS/2, and of OS/2 when talking about running true OS/2 programs directly under OS/2.

At the time of testing there were few applications programs released which could be run directly under OS/2. One of these was DisplayWrite 4/2 and another was the new version of the Norton Guides. Dis-

*... my experiences
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users to a major change
in their working methods
and require a major
investment in learning
new skills.*

playWrite 4/2 came installed on the test machine and I quickly installed Norton Guides. Other programs which could be run under OS/2 include the OS/2 prompt, very much like the DOS prompt.

Multiple copies of any one OS/2 program could be run simultaneously, and one or more copies of other programs could also be run simultaneously. Pressing Ctrl-Esc takes one back to the menu, while Alt-Esc toggles from one running application to another. True OS/2 applications continue to run even when in the background, but DOS applications running in the Compatibility Box are suspended when they are not on screen.

Later I will talk about software compatibility under DOS 3.3, and compatibility under the Compatibility Box, but I found it fascinating to have Windows 2 running in the Compatibility Box, two separate copies of Displaywrite 4/2 under OS/2 each processing a different file, and Norton Guides also running under OS/2, and be able to go from one to the other by just pressing Alt-Esc.

Without turning this into an OS/2 review, my experiences removed my fears that OS/2 would subject users to a major change in their working methods and require a major investment in learning new skills. The external and internal commands in OS/2 are familiar to any DOS user; the CONFIG.SYS file remains (with many additional and more powerful commands), and batch files remain with the files having .CMD and not .BAT extensions. I had no OS/2 manuals with the system, but had no trouble running it and customising it to my needs using the basic principles learned over the last few years with DOS.

Compatibility

Even when running under DOS 3.3, compatibility with existing software is not perfect, but was good for nearly all applications tried. Under the DOS prompt within OS/2, nearly everything ran just as it did under DOS 3.3, but again there were a few more programs which did not run as expected. Amongst the programs which worked perfectly under DOS 3.3 and also under the OS/2 DOS Prompt were Xtree-Pro, QuickBasic 4, Turbo Pascal 4, Word 4, Windows 2 (with minor limitations), Telix, Norton, Coretest, most of the *PC Magazine* benchmarks, and a host of utility programs. Even SideKick ran in the compatibility box, as did Lotus 2 (with drivers set for EGA).

Lotus 1A, using the CGA drivers, ran perfectly in text under DOS and the Com-

Benchmark		Model 80 DOS	Model 80 OS/2	PC	Ratio Model 80 to PC
MyBench (sec)	1	0.16	0.19	1.32	8.25
	2	0.66	0.65	5.00	7.58
	3	1.50	1.56	12.19	8.13
	4	1.59	1.57	12.47	7.84
	5	1.71	1.75	12.62	7.38
	6	3.07	3.12	24.38	7.94
	7	5.11	5.16	39.71	7.77
	8	4.83	4.90	37.73	7.81
CORETEST	Disk Size	73.40	73.40	49.00	
	Cyls	70.00	70.00	614.00	
	DataTrRate kB/s	797.00	799.80	227.40	
	AvSeek ms	34.70	35.40	34.20	
	Track-track ms	13.70	14.50	9.40	
	PerfIndex	6.33	6.31	2.96	
NORTON	SI	17.60	17.30	1.00	17.6
	DI	3.20	NA	2.30	3.2
	PI	12.80	NA	1.40	12.8
IBBMARK (sec)		3.59	3.70	27.19	7.57
LOTUS (sec)	Load	13.86	14.21	70.29	5.07
	Recalc	2.67	2.70	22.53	8.44
	Save	12.51	23.98	61.78	4.94
CBSIEVE2 (sec)		14.32	14.81	146.48	10.23
dBASE II					
St	1	127.60	135.55	917.50	7.19
	2	145.20	NA	490.50	3.38
	3	171.50	NA	561.90	3.28

Table 1. The YC benchmarks showed the Model 80 to be a good, fast 386, though there are machines marginally faster. Note that the PC used in the comparison had a hard disk that is much faster than usual, so the ratio between the Model 80 and an XT would actually be greater than the table shows.

patibility Box, though when switching to graphs the screen became hopelessly confused. dBASE II ran the *Your Computer* benchmarks perfectly under DOS, but 'fell over' under the Compatibility Box. Brooklyn Bridge and Laplink, both specialised high speed communications programs, could be run under DOS, but not at their default speeds and had to be slowed down to 38,400 baud. Neither would run in the Compatibility Box. Windows 2 could run all the true Windows applications from within the Compatibility Box, but could not run conventional applications unless under DOS.

Most EGA demonstration and test programs worked perfectly under DOS and the Compatibility Box, though two of the most familiar did not. When this occurred, I tried the same packages on a Model 50 with 8513 monitor and had exactly the same result. It appears to be the result of people writing badly-behaved EGA programs for the original EGA card, and that the undocumented functions they have used are not supported on any of the PS/2 range. Self booting programs like Flight Simulator and Jet didn't work. While Flight Simulator started properly when run from the DOS prompt, it 'hung' before the game actually started.

Overall most software did run, and it is certain that any software being written will be arranged so that it is compatible. If you have a large investment in software that you want to run on the Model 80, some careful testing would be essential before plunking down the dollars.

Keyboard and mouse

The Model 80 has the IBM Enhanced Keyboard. Above the QWERTY keys are 12 function keys. At the extreme right of the keyboard is a numeric keypad. Between the numeric keypad and the QWERTY keyboard are a separate set of cursor keys and also an additional set of Home, End, Page Up, Page Down, Insert and Delete keys. I am slowly getting used to the layout, though for a writer the original PC keyboard has a better layout. My greatest complaint is that the layout of the Enhanced Keyboard makes entering *. very tedious! Despite this, the new keyboard has some advantages, especially for those who constantly use spreadsheets, and for those who must regularly use PCs as mainframe terminals.

The review machine also had, as an option, the PS/2 Mouse. It is a lovely, compact, free running two button unit. A delight to use, and essential for many programs like Windows.

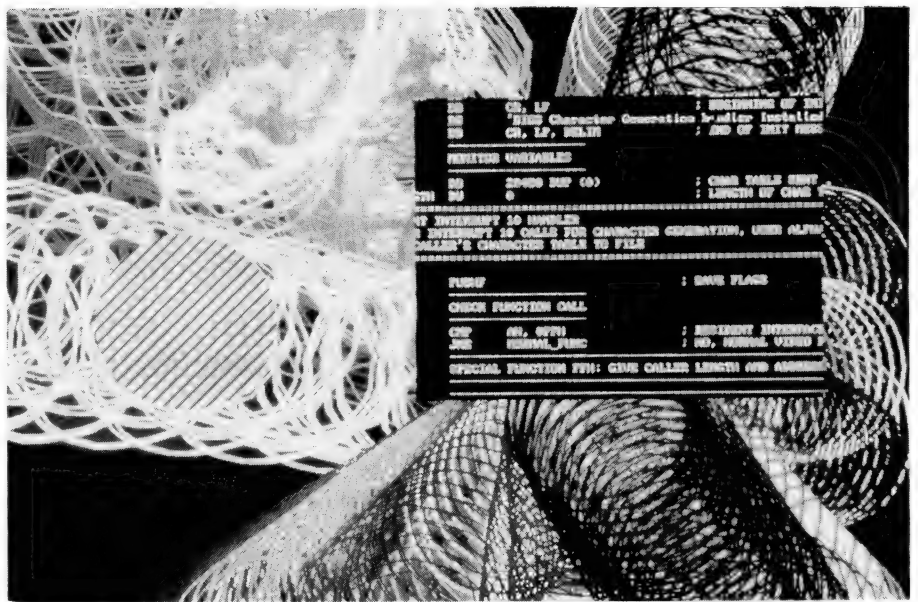


Figure 2. The Model 80 can run multiple copies of any one OS/2 program, and one or more copies of other programs simultaneously. Ctrl-Esc takes one back to the menu, while Alt-Esc toggles from one running application to another. True OS/2 applications continue to run even when in the background, but DOS applications running in the Compatibility Box are suspended when they are not onscreen. Shown above is a graphic demonstration running in the background, while the demonstration program scrolls in the window.

Documentation

No manuals for DOS or OS/2 came with the machine. A *Quick Reference Guide* was included, and at 62 pages attests to the simplicity of setting up a Model 80. The design does not require the setting of DIP switches, and with many functions on the motherboard which would be on expansion cards in earlier PCs, there are fewer choices needed by users anyway.

Also in the same box as the keyboard was a card which, in a series of sketches without captions, clearly showed how and where external devices like monitors and keyboards should be connected. Packed with the *Quick Reference Guide* were two disks for setting up the machine, though this was all done in advance for me.

Benchmarks

I ran a series of benchmarks on the Model 80, including the standard YC benchmarks shown here and several others. Overall they indicate that the Model 80 is a good, fast 386 though there are others around with marginally better speed.

When comparing the benchmarks with the standard PC speeds just remember that the PC used had a far faster than usual hard disk, and thus ratio between the Model 80 and an XT would actually be higher for disk-based task than is shown.

Conclusions

If one is looking merely for a fast PC to run existing PC software one should check out the Model 80 very carefully. I found enough software that did not like either the video or the serial chip to suggest that it is aimed at software yet to be released rather than at the vast range of existing software. Physically it is very rugged, though the video, keyboard and mouse connectors are a little fragile and the memory daughterboards are only supported along one edge.

OS/2 on the Model 80 really excited me, and I am sure that when true OS/2 applications are released they will make the Model 80 one of the machines which has to be on every short list. □

Product Details

Product: PS/2 Model 80
From: IBM, Coonara Ave,
Pennant Hills 2120 NSW
(02) 634 9111
Price: System unit \$17,680,
8514 Monitor \$3500,
8514A Display Adapter \$2777;
PS/2 Mouse \$207,
OS/2 Version 1.0 \$706,
DisplayWrite 4/2 \$1065.
All prices taxed

THE WAY OF THE FUTURE?

Recently I have been trying to decide which PC to buy. To help make my decision I have done quite a bit of reading including recent issues of *Your Computer* and *Byte* magazines, and I have also talked to a number of my colleagues. I have not yet come to a decision but my thoughts as a result of these investigations may be of assistance to you, but note that I do not profess to be an expert on computer hardware, and my crystal ball is a bit cloudy of late. Also I come with my own prejudices and needs which may be quite different from yours. Having said all that, let's get down to business.

In 1987 IBM announced its PS/2 series of microcomputers and the new operating system OS/2. The PS/2 series is definitely a big step forward. The architecture of the new machines means that it will be a while before true compatibles appear on the market. Does this mean that we have only three choices today: buy an IBM with a pretty hefty price tag, buy yesterday's technology by buying a micro from someone else, or wait for several months for compatibles to arrive? (I am assuming that software investment means that moving to a Macintosh or other 68000/68020 machine is not a viable option.)

Perhaps these are not the only choices! To see why let's have a very quick and non-technical run through the features of PS/2 and OS/2. We start with the innovations in the IBM PS/2 series. Firstly, the 8088 chip is out! Despite the inclusion of the IBM PS/2 Model 30 in the new series, it is also fairly clear that the 8086 is on the way out.

This leaves the 80286 and 80386 chips. The 80286 was the chip in the IBM AT class and now resides in the PS/2 Models 50 and 60. Despite the deficiencies of this chip, IBM has gone for it rather than the 80386, which is a true 32-bit chip and obviously superior. (Not only is the 80386 faster but, unlike the 80286, it is capable of running several MS-DOS programs at the one time, that is true MS-DOS multi-tasking.) IBM has put the 80386 in its PS/2 80, but this machine is out of the price range of most of us. (If it is in your price range then it deserves very serious consideration as do the Compaq Deskpro 386/16 and 386/20.)

Therefore, it seems clear that today one should be looking at 80286 machines. Further, while the IBM AT ran at 6 or 8 MHz,

Sid Morris of AMSEC describes the dilemma that would-be purchasers of micros have today and offers some thoughts.

the 80286 in the PS/2 Models 50 and 60 run at 10 MHz. There are other 80286 machines on the market with the same or even faster clock speeds. Indeed we can say that IBM has effectively instructed us not to be satisfied with less than 10 MHz.

IBM has settled on its enhanced AT keyboard for the PS/2 series. The keyboard has 101 keys including separate cursor keys and 12 rather than 10 function keys. Despite the smaller Enter key it is a very good keyboard and whatever machine you buy you should try to get this style keyboard. It comes standard on many compatibles and is available at an extra cost of under \$150 on others. It is very likely that some future software will require the 12 function keys.

Following in the footsteps of the Macintosh, Amiga and Atari, IBM has moved from 5¼ inch disks to 3½ inch disks. This is a very sensible move as the smaller disks are easier to handle and transport and are better protected in their rigid plastic cases. They are high density and hold more data than the high density 5¼ inch disks – 1.4 megabytes compared with 1.2 Mbytes. I have little doubt that 5¼ inch disks will be around for some time, but other manufacturers will move to the smaller disks too. So if you are buying a micro now, you should consider adding a 3½ inch drive if it doesn't already have one. To support the 1.4 Mbyte disks you will need DOS 3.3. With the more commonly available DOS 3.2, you can still format the 3½ inch disks at 720 Kbytes.

IBM has certainly upped the ante with its new VGA graphics which is surely destined to supersede the EGA standard. VGA is, in fact, downwardly compatible with Hercules, CGA and EGA. At the same time IBM has switched to analog monitors so we can have a much larger range of colours.

Where does that leave everyone else? If

you currently use a Hercules card with a monochrome monitor then there doesn't seem to be any reason to change. On the other hand if you use colour, then buying a new system with an EGA card and an expensive EGA monitor appears unwise to me. Tomorrow's software is likely to use the VGA standard. Fortunately there is a way out. You can buy a VGA card, such as Vega's. If you combine this with a monitor like NEC's MultiSync which can support digital and analog and all of the above mentioned cards then you get the best of all worlds. The card and monitor may cost you about \$1,800. The NEC MultiSync monitor also allows for even higher resolution in the future.

Next we turn to the operating system OS/2. This will not run on 8088 or 8086 machines, not even the IBM PS/2 30. It should run on 80286 and 80386 machines. Later, IBM will come out with a special version of OS/2 which includes Presentation Manager and it apparently will not run on non-IBM machines. An alternative route others can take is OS/2 plus Microsoft Windows. Like the IBM version this will provide a friendlier interface than we are accustomed to with DOS. Whether OS/2 will kill off DOS is not something we have to speculate about, however, as it doesn't seriously affect our choice of machine – unless you feel you must have IBM's version of OS/2.

Finally the PS/2 series offers the Micro Channel architecture to speed up input/output. I haven't seen a good alternative to this but it should be remembered that sticking with the current bus means that you can use all of your favourite boards while changing means you can't. Whether IBM's Micro Channel bus is the one of the future one can only guess. It may be!

To sum up, in my opinion, and it must be remembered that it is only the opinion of one person, it would not be at all foolish today to buy a quality AT compatible such as is made by Compaq, Kaypro or NEC, and add a VGA card, MultiSync monitor and a 3 1/2 inch drive. This should cost less than a similarly configured PS/2.

On the other hand if you want to play it safe and go with IBM (and no-one is supposed to get fired for that) then give serious thought to the IBM PS/2 Model 60 rather than the PS/2 Model 50. The former has faster hard disk access and an adequate number of expansion slots. □

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LAPTOP LOWDOWN

Sharp PC 4500, Hitachi HL 300, and Prolap 286

A nest, a bevy, a herd of yet more laptops crowding my desk, forced me to install new hardware to cope! My new 'support system' is about six foot by three: I found a door and laid it on supports from my old desk so I am now the proud possessor of an Extended Computer-Supporting Desk – and don't I need it!

The parade this month is different from earlier offerings. The beige uni-suit has been deserted. The machines are all different shapes, even if still all whites or greys. All the screens are different sizes, too – and the disk drives are all configured differently. And, their prices are all quite different!

Sharp PC 4500

The Sharp PC 4500's screen (6 x 13.4 cm) has all the excellence displayed on its other portables. It is bright, with dark blue letters on light blue which can be easily inverted. I found it very easy to read, both for spreadsheets (Multiplan) and for word processing. It is by far the best on any laptop priced under \$3,000 that I have seen.

As with the other two machines under review, it provides for 25 lines of 80 characters or a standard 640 x 200 bit-mapped pixels.

Sharp has chosen to make a port and card for an external monitor an optional extra; it supports both mono and colour. This is a shame as most laptops include this option, but then, Sharp has put an excellent screen on the laptop itself.

The machine runs on its internal lead battery for up to seven hours if the floppy drives are used ten per cent of the time and if the screen backlight is switched off. If the backlight is on, battery life is appreciably cut down. In practice you keep it

Jan Roberts' laptops are all different this month – in size, shape, price and configurability (there's even an 11 inch screen!).

plugged in (and thus fully charged) when used near a power point as it takes eight hours to recharge.

The screen with the backlight off is quite usable if external lighting is good and directly on the screen. But it is so much better with the backlight on that you would be crazy to switch it off, unless it were essential to work away from power sources for a whole day.

If you operate your software from a RAM drive rather than from the floppy drives, the battery should last much longer. (This, of course, is true of all laptops.)

The Sharp keyboard layout is also the best of the bevy on the catwalk today. It is very well spaced: I could touch type with ease, although I found the bounce a little hard. The ten function keys are well spaced and easy to find in two rows at the top. There is a separate numeric keypad on the upper right (rather like the NEC Multispeed), plus a cursor pad on the lower right.

But laptops generally seem to have problems placing the large plus and minus keys which are found on the far right of most standard keyboards. They are, on the face of it, missing from the numerical keypad on the Sharp. It took a phone call to discover you can get them by typing Alt-Backspace and Alt-Enter.

These keys have different keycodes to the smaller plus and minus signs avail-

able in the main part of the keyboard and quite a few programs put them to specific and important use. They are essential to Framework II, they are used for outlining in Microsoft Word, they are used in Smart-Key as 'hot keys' and in Nortons for selecting files, yet most laptops omit them, or have them available only with complex keystrokes.

The Escape key on the Sharp is where I'm accustomed to finding it (but often isn't) – on the upper left. It has a good large Enter key on the right and green LED lights next to the Scroll, Num and Caps Lock keys. There are LEDs along the top for Power, Low Battery, Drive A: and Drive B:. Overall, I would rate the PC 4500's keyboard as one of the finest I have seen on a portable.

If you operate your software from a RAM drive rather than from the floppy drives, the battery should last much longer.

On the right hand side of the computer are the controls for brightness and contrast. I found that if I turned up the brightness to the maximum, a disconcerting hum was emitted. However it is comfortably bright with the hum at a level that is practically inaudible.

The right side also holds two 3½ inch disk drives with the A: drive the lower, the external power socket and a power off/on button.



Figure 1. The Sharp PC 4500's screen is bright, with dark blue letters on a light blue background – it's certainly one of the easiest to read screens available on a portable. This XT-class machine only weighs 5.1 kg.

A 20 megabyte hard disk is optional – it has a fairly slow average seek time of 78 ms.

The back of the machine has no ports (apart from a metal plate for possible future expansion). Instead, all the ports are on the left hand side, the logic being that the ports are liable to get dirty if the machine is set down like a briefcase while carrying it.

Also on the left side are standard Centronics and serial (RS232) ports and a port for an external 5¼ inch floppy drive. The Setup Program easily changes the external drive from C: to A: drive.

There are also spaces left to install a socket for an external screen and for accessing an internal modem. The modem isn't yet available in this country.

Underneath the machine there is a fold out handle and a set of dip switches. The first dip switch is the ultimate Reset button if your machine locks up and absolutely refuses to work. I needed to use it to

exit from Flight Simulator. Unfortunately this also blanks the time and date requiring the machine to be re-configured with Set Up.

Switches 4 and 5 set the speaker volume on or off, low or loud while switches 2 and 3 are mysteries! The manual tells me that these are used 'to identity (sic) the display mode. See Chapter Six for more

Product Details

Product: Sharp PC 4500
From: Sharp Australia, 1 Huntingwood Dr, Blacktown 2148 NSW
 (02) 831 9111
Price: \$2950 with single 3½ inch drive, \$5200 with 3½ inch drive and 20 megabyte hard disk, \$395 external monitor card, \$995 1 megabyte EMS card, \$90 blank ROM card.
All prices taxed.

detail.' Chapter Six told me 'indicate the type of display. See Chapter Three for further information'!

But, to be fair, I didn't spot any other mistakes like this in the manual and, generally, the manual is excellent.

There is provision for fitting an optional 1 megabyte EMS memory card. Full and simple instructions are given in the manual to allow anyone to install it. A far cheaper option is to put in a blank ROM card which allows you to install ROM based software up to three quarters of a megabyte. You could thus have your favourite word processor and spreadsheet always available.

Hitachi HL 300

Now for our next contender, the HL 300. This is the base model of a new range of portables Hitachi intends to introduce over the next year. It intends to be fiercely competitive in pricing and to grab a large slice of the Australian market in the next 12 months, so keep an eye out for them.

The lid covers the entire machine, not just the keyboard. When you lift it (unlocking it by pressing somewhat awkwardly on two side 'buttons'), you find the lid contains a delightfully large, 11 inch screen. However, when you switch it on, it is not as brilliant as the Sharp but much like other backlit LCD screens.

With good room lighting, it can be read with ease when word processing, even at a distance of a yard from the screen. Words and lines are well spaced, but, when I loaded a spreadsheet (Multiplan) into it, I found it was not very easy to read. You need to set the machine to non-graphics with a 'MODE bw80' command and to install Multiplan for a non-colour text screen.

To the right of the screen are a speaker, battery and power lights, a contrast dial, a speaker volume dial and a slide speaker on/off control.

The upper part of the top of the machine between the keyboard and the screen is covered in a plastic sheet below which instructions or templates can be slipped.

The keyboard is this machine's finest feature. This is not because it is unusually well laid out, but because it lifts out. It is attached by a cable about two feet in length. You can use it in the machine or hinged on the front of the machine at a comfortable angle or totally separately. It is a slim keyboard with excellent touch.

I asked the opinion of a friend with RSI



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Figure 2. Hitachi's PC-class HL 300, marketed exclusively through Blue Chip, is the base model of a new range of portables Hitachi will be introducing during the year. The backlit LCD screen is 11 inches across!

— he found the touch excellent with a soft bounce to the keys. He liked the slimness of the keyboard and thought the way that it can be moved around and even perched on a lap, would be of assistance in preventing RSI.

It is a wide machine, and the keyboard benefits from this. But with the function keys on the left, there is no room for a separate numeric keypad. Instead, part of the keyboard can, in the fashion of laptops, be toggled into functioning as a keypad.

The Num and Caps Lock keys have green LED lights in the tops of the keys themselves. There is no LED for the Scroll Lock.

The two disk drives are on opposite sides of the machine with the A: drive on the right and appropriate LEDs on top to indicate when each is in use. One excellent design feature is that the drives are protected by doors. These should help keep out deadly dust when travelling with

the machines. The only control on the sides of the machine is the power on/off switch on the left.

At the back of the machine another door protects the various ports. There's a parallel Centronics port, a serial port, a port for an external 5 $\frac{1}{4}$ inch floppy drive, an expansion port labeled 'common bus' and two separate power inlets — one is for recharging and the other for power. Both are connected to the same supplied transformer. There is no connection for an external monitor.

There is nothing underneath — not even a handle. Instead, a rather smart carry case is provided.

Product Details

Product: Hitachi HL 300
Distributor: Blue Chip Computer Stores
(03) 383 5655, (02) 929 8799
Price: \$1695 taxed

Prolap 286

The Prolap 286 has a narrower screen than the other two machines, and is, like the Hitachi, a backlit LCD. However, it uses a very neat font. I found the screen exceptionally good both for word processing and for spreadsheets. Multiplan ran with great visual ease (no need for special configuring!). A CRT port is provided for an external monitor; toggling to it is quite straightforward.

The keyboard is narrower than the Hitachi, but still well designed and easy to use. The function keys are along the top, as are the LEDs for low battery, Caps and Num Lock, A: and B: drives and, surprisingly, an LED labeled 'Off hook' to make the use of a modem card easier.

Initially I wasn't too keen on the touch of the keyboard (not enough spring to the keys), but I quickly got used to it. Part of the keyboard toggles into a numeric keypad, including both a plus and minus key.

On the right side of the machine there are two 3 $\frac{1}{2}$ inch drives and blank sockets for the use of the modem when installed. Drive A: is on top with this machine, unlike with the Sharp. I wish they would standardize on having the A: drive on top; it seems more logical.

At the back there is an power on/off switch and socket; the serial, parallel and CRT external monitor ports are all deeply inset. The serial port is a DB9, which is unusual since most machines use a DB25, so beware, you may need to get an adapter. These ports are covered by the handle when the machine is not connected — another good dust-proof measure.

On the left side of the Prolap is the contrast dial and a socket for an external full sized AT keyboard. You access this by typing Backspace-Enter at power-on. You can operate the laptop from an external keyboard with a full sized monitor connected without even opening the laptop up!

You can expand the machine greatly — not only can a modem be added, there is also a 2 Mbyte RAM card available and provision is there for a maths co-processor. An external expansion box with its own power supply is available. It will take three short cards and one 3 $\frac{1}{2}$ inch half-height hard disk.

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Trials

At the starters gate, the Sharp weighs in at 5.1 kg (the hard disk model is a very light 5.7 kg), the Hitachi is a bit heavier and the Prolap is just a touch heavier still. If you need a laptop much lighter than this, you would be advised to look at the Toshiba T1000 which is about 3 kg.

The Sharp boots very speedily despite running through a full diagnostic test of ROM and RAM, keyboard, processor and clock. The manual quotes a very respectable clock speed (for a laptop) of 7.16 MHz. (The processor is an 80188 so the machine is an XT clone.)

If you press the Set Up key, a ROM-loaded screen comes up instantly. Here you set the clock and date (in the correct format and with the month spelled out in full). An alarm can also be set.

Set Up also allows you to change the display type from graphics to monochrome, to set different cursor types and speeds of blinking both for the cursor and for characters in some programs, reverse or normal video for background, backlight on or off.

I did find some difficulties due to screen reading problems. I thought I had found a strange error in WordStar 3.3 – I could not copy blocks – but then I realised that all text was high lit and the blocks were in 'finer' type.

If you add the extended memory option, you can have a good-sized RAM disk to speed up the machine and save batteries. But the RAM disk is not battery backed and blanks when you reset.

When you switch it off, a dear little message may appear: 'Going to sleep ... alarm enabled.' This means it will wake up at the time set; if the alarm isn't on, it simply says 'Powering off'. As I mentioned above, its modem will also wake up the machine to take incoming calls.

In all, the Sharp is very well thought out. The NEC Multispeed beats it hands down for ROM-based builtin programs, the Toshiba T1000 beats it for its DOS in ROM plus its battery backed RAM disk – but if you want a very good screen, it is the best of these lower end laptops.

Despite such good features as a large screen and detachable keyboard, the Hitachi HL 300 is not as polished in design as the other machines. The screen will not tilt back far, its screen clasps are awkward to unlock, the keys are awkwardly spaced, it cannot be expanded, and it does not have a setup utility. But don't



Figure 3. The AT-class Prolap 286 from Atlantis has a backlit LCD screen with an exceptionally easy to read font. This same machine has a world-wide reputation under the Halikan name.

forget the price and that great 11 inch screen plus six hours of use from the batteries on their own.

It has the slowest clock speed, running at the old standard IBM PC rate of 4.77 MHz. This only really affects the average user at boot up, which takes half a minute longer. I tried editing (in WordStar 4) on the Hitachi and the Sharp side by side: differences in speed scrolling and saving times were not noticeable.

The large screen compensated in part for the lack of provision for an external monitor. If lighting is good, the screen is the easiest of the three to use and will cause no eye strain. A screen this size was only previously found on top-end laptops costing over \$5000!

And, on a crowded desk, the removable keyboard is a real boon. You can have the screen and drives up on a shelf over your desk with the keyboard lower down eliminating all need for a separate monitor.

The Prolap 286 is an AT clone running at 10 MHz. It boots much faster than the others, naturally. For general use, an XT like the Sharp can do all an AT can do despite the AT's far greater potential – its hands are tied by the available software.

I didn't have any of the expansion options installed so I couldn't fully test that potential power.

It has a setup program, but it forces you to step through every choice one by one, instead of allowing you to select from a menu just the factors you want to change. It's also only available at booting time.

I found it's screen easy to use as long as the room was well lit. Multiplan spreadsheets were much easier to read than on the Hitachi as the machine has a colour board on board. However, the keyboard cannot emulate, as far as I could discover from the limited manual, the large plus and minus keys.

This is an excellent AT laptop for all who need this power in the field. Coupled with the optional (and removable) hard disk expansion box which I did not test, it has great versatility. But I wish AT laptops were cheaper! □

Product Details

Product: Prolap 286

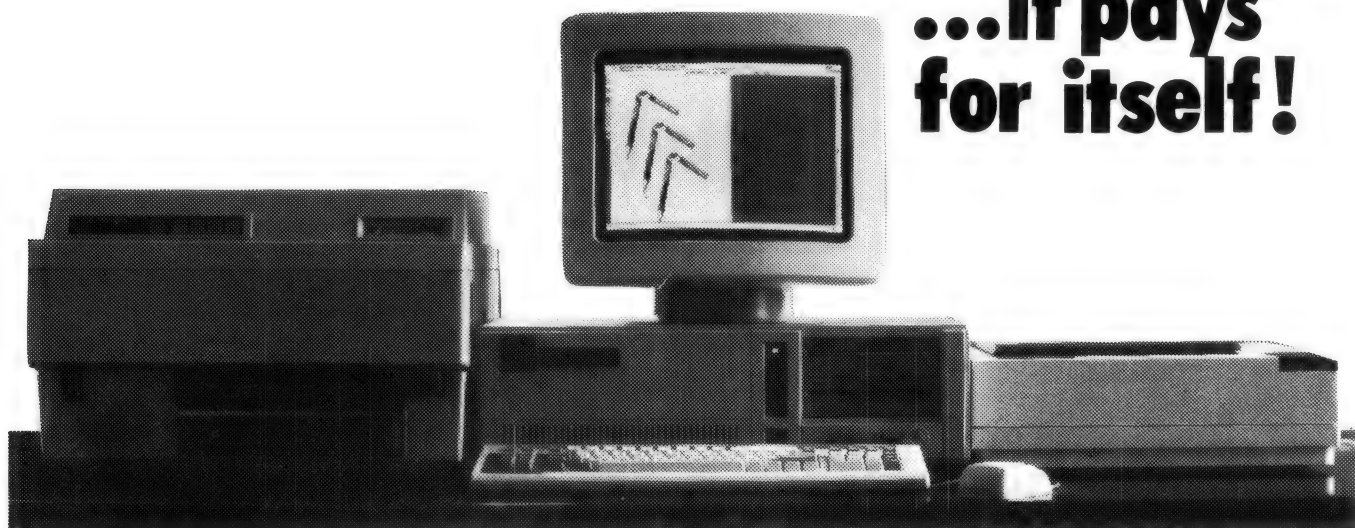
Distributor: Atlantis International, 49 Wadham Pde, Mt Waverley 3149 Vic. (03) 277 3139

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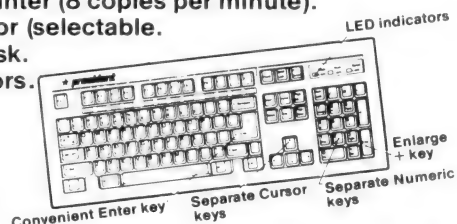
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System Requirements

- IBM PC/XT/AT, PS/2 or 100% compatible
- 25K RAM
- DOS version 3.1 or above
- One standard RS-232 serial port configured as COM 1 or COM 2

Compatibility

- Lotus 1-2-3™
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- Wordstar®
- Microsoft® Bus Mouse compatible (absolute mode)
- Microsoft® Windows™
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TORNADO NOTES

HAVE YOU READ any of the references to things like hypertext? To a layman like myself I have a vision of hypertext permitting the stacking up of information into some giant file from which I will miraculously recover both the data section that I want, and all like references. Being one of the world's gatherers of numerous vital, but often small pieces of information (such as phone numbers, contacts, references, memos and the like), the American advertising for Tornado Notes, which seemed to imply some of the above capabilities, definitely set me thinking.

Could my computer actually replace much of the junkyard of torn off edges of paper, telephone message pad scribbles and those ubiquitous bits of paper with sticky edges that perennially adorn my workplace? At \$US49.95 (plus \$10 postage and packing) it didn't seem like too much of a gamble. So with that minor trepidation that you feel when you sign a credit card number, I took the plunge and about three weeks later I was eagerly unwrapping one of those diskette sized plastic wallets that housed a single disk and 'kiddy's book' user manual.

System requirements

You will need about 53 kilobytes for the RAM-resident program, even though it can be run directly, and an adjustable amount of memory up to 54 Kbyte for the note buffer and you're away. Just keep the manual handy. Despite a very intuitive feel for any regular computer user, Tornado Notes can have a few surprises at first, mostly good.

While setups are available for CGA, EGA and Hercules, the defaults seem to get most systems underway without drama. It is best, or perhaps safest, to keep the note piles (as each stack of information is known) under one subdirectory. The system demands are such that Micro Logic are happy to say the minimum requirement is a single disk drive and 128 Kbyte

James Fortune has found a pop-up note keeper that makes an ordinary PC look fast – and will go a long way towards cleaning up all those bits of paper on your desk.

memory. If you are really ambitious, Tornado Notes can control up to 676 of these piles, each with a maximum size of 54 Kbyte or 500 notes, whichever comes first.

Hot keys and screens

If you have delusions of grandeur, and love dreaming up useful hot keys, you can install more than one copy of Tornado Notes, in which case you could probably even attempt to store the Yellow Pages!

Once installed, a hot key (Alt-I is the default but it is readily changeable), brings up a screen like that in Figure 1. This is part of the default note pile called NOTE.TN that is chosen at startup, even if other piles are then chosen, the system will remember them until shutdown or reselection.

Before considering information handling, the initial screen is a useful source of information in itself. The command menu, in this case in the bottom right hand corner of the screen, is switchable via the F1 key to reveal a brief help summary for each command. Once you feel comfortable with the system, a further tap on F1 will blank the command screen and maximise the on-screen space for your pearls of wisdom. This approach is repeated for all menus and submenus.

The second feature of the screen worth mentioning is the bottom line or control

bar, which reading from left to right gives a summary of which of the menus you are using, the name of your current note pile, the number of changes to the note pile since you last saved it to disk, the total number of notes in the pile, the size of the current note, date, time and serial number of the program.

The other feature of the general display is that notes can be overlapped to maximise the amount of information that can be on the screen at one time, or they can be 'tiled' so that no overlap occurs. Tile mode is useful for PrtSc dumps as in Figure 1.

Finally, and most importantly, when you are viewing a number of notes, the one at the top left in the double box is the current note. The sizes can be both automatically set to minimise white space, or set by the user when a note is added or edited. A note can be a single letter or a whole screen page of information.

Information storage and retrieval

Before boring you completely, which would do this program a major disservice, let's add a new piece of vital information. You are in the midst of a vital spreadsheet; the phone rings and it's a message from your boss on how to handle some contract negotiations next week. We're still in learner mode, so upon hanging up the phone you reach for your latest scribble pad to write yourself a note.

Remember Alt-I. Suddenly your note pile is in front of you, you key in N (for Note) and a new blank note is ready, you type away, using WordStar-like commands if you wish plus the PgUp, Home and End keys and then hit Escape. This takes you to an intermediate menu (SUB-EDT) which permits things like resizing the window to suit your requirements, adding date and time stamps, putting sequence numbers on your notes and a few other tricks. Hit Escape again and you are back at the main menu.

If it is an absolutely vital piece of information it might be worth typing D S (Disk Save) to ensure that it is away from the eternal threat of volatile RAM. The C (Clear) command will drop you back to your original application, having prompted you to save changes, if any were made.

Having patted yourself on the back for becoming a computerised note scribbler, you remember that you actually have a whole lot more information on contracts and you need a reminder and so you won't use the Clear key yet. G for Get seems a a reasonably logical sort of command. This will reveal another menu and a line of graphic boxes followed by a line of dots. The boxes indicate notes, and the dots indicate how many more notes of your average size could fit in the current pile. A simple, but very handy way of reminding you that size might be limiting.

Could my computer actually replace much of the junkyard of torn off edges of paper, telephone message pad scribbles and those ubiquitous bits of paper with sticky edges that perennially adorn my workplace?

The screen is also prompting for input of a key word. This is not a special word, but any piece of information that you think will be useful in locating a note such as a person's name, a date or in this case, the word 'contract'. Start typing and something interesting happens to the little boxes. As you type C, the system is case insensitive, all boxes representing notes that don't contain that letter will turn to dots.

This process continues until either you have entered the whole word or phrase, or your phrase has a unique match. As soon as letter combination is unique the note concerned will be displayed onscreen, a handy feature for names and phone numbers. If the match is not unique, the control line, plus the number of remaining boxes will tell you how many items match

your request. Using the Enter or Return key will display all the matching notes on screen. If you still have too many the system permits a further level of discarding via a Keep command, which can be useful if you do use an orderly system of main topics and subheadings. The Escape key will return you to the whole pile, or you can wander around and edit any of the notes in the Search subset.

Another nice part of the Get command is that it handles wildcards, in this case the ?. Therefore if you can't spell receive,

rec??ve will recover both variations in your note pile.

All very tedious you say. The one thing a review can only tell you about is speed. Read back, and all commands are single letters, searching a 500 note stack takes about two to three seconds, and never forget, you arrived here from the midst of your singing spreadsheet. It's worth having to find something in a note pile just to run Tornado Notes. You too can have a speed freak experience on the lowliest of 4.77 MHz machines.

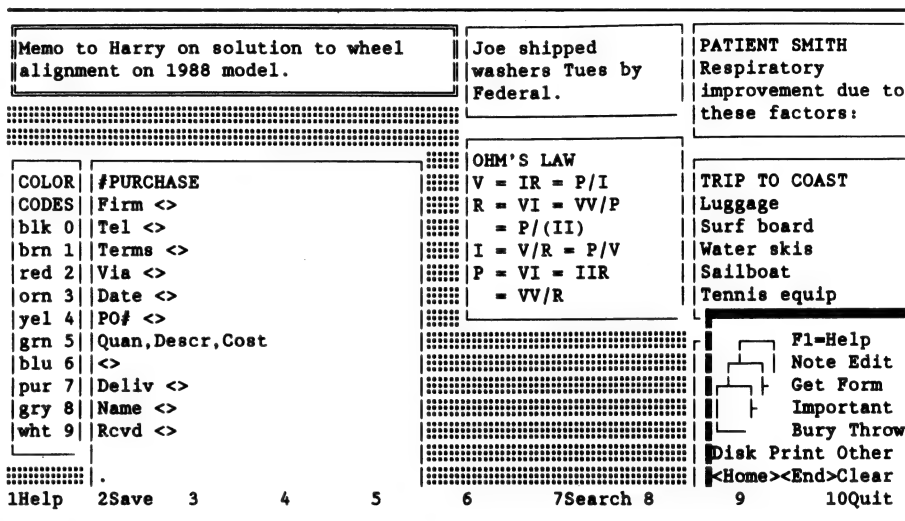


Figure 1. Alt-J brings up Tornado Note's default 'note pile'. Note the command menu at lower right, and the 'control bar', across the bottom.

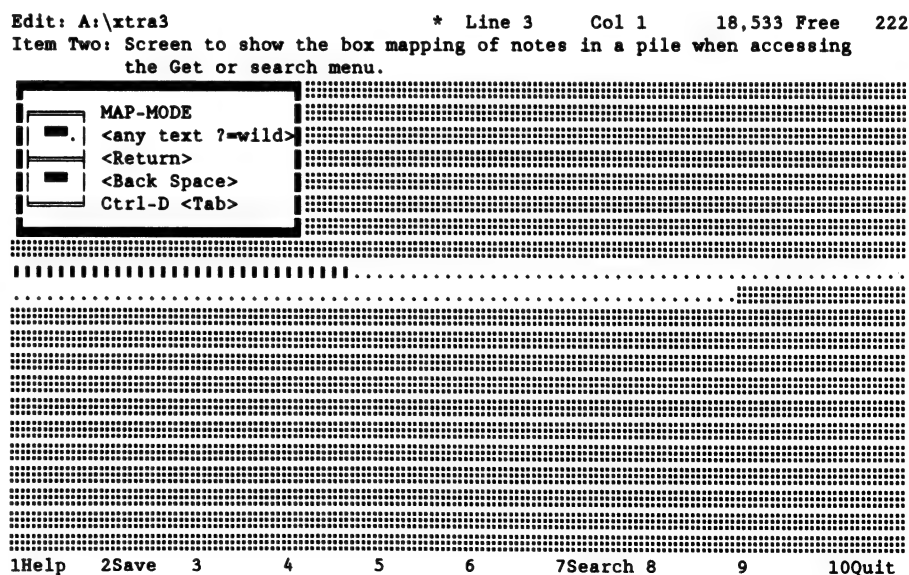


Figure 2. G (for Get) brings up a 'map' of your notes - the boxes indicate notes, and the dots show how many more notes you can have when the screen is first called. While searching for a string in a note, the notes without the string turn to dots.

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Importing, exporting, putting and grabbing

The Public Domain arena abounds with little gems for storing the current screen display. Tornado Notes makes this type of handling both useful and easy and might even encourage some users to attempt it more frequently rather than go through data reentry.

Put and Grab do just that. Put will enter the entire contents of the current note straight into whatever application you are working with like a word processor, spreadsheet or database. Some caution is obviously needed to avoid cell or field overflow, but a bit of practice soon polishes these skills. Grab just takes the full screen and calls it a note, enabling it to be saved, put elsewhere or edited.

Import and Export permit the transfer of notes to and from ASCII files. It is also possible to set the system to handle direct transfer to WordStar files.

Forms or templates

There is a note in Figure 1 that has PURCHASE as its first word, followed by a number of field titles and brackets. When you choose the F (Form) option from the main menu, the system prompts for the first letter, in this case P, of the form template. The cursor will then be located between the first brackets awaiting data entry. Having entered the data, the Tab key will then advance the cursor to the next location for input. It doesn't matter if the fields are empty.

This system is most useful for standard items like phone messages and it is obviously one of the areas that Micro Logic sees as a real strength. Imagine the telephonist of a small business working at a keyboard using a telephone headset. The message is directly entered into a note pile as it is received. Tornado Notes enable it to be printed out to be placed on someone's desk or with their mail. When they complain that it has not been received a second copy neatly time and date stamped can be printed off.

Printing options are basic. You can control margins, number of notes printed, line spacing between notes and when to eject paper from the printer. This last bit would be handy if you had small pieces of paper for something like telephone messages.

Walking

How else to display your pile of notes but to take them for a walk across your screen?! This is a command, with fully adjustable timing, that will display your notes one-by-one onscreen. It is use-

ful for an eye-catching, self running demonstration, or just browsing to perhaps find out how much junk you have accumulated and which ones might be eligible to be thrown into the trashcan (an 'original' little icon that is used when you wish to discard a note).

The more usual display technique is via the up and down cursor arrows if you wish to step through single notes, or with PgUp or PgDn to display a page at a time in tile form to rapidly review all notes.

If you find a note on your journey that you wish to rapidly locate in the future it can be made Important or Buried to put its location at either the top or bottom of the pile. Then it can be accessed with the Home or End key.

Documentation

The documentation ranges from the dreadful to exceptionally useful, but overall it contains what you might need to know initially, and wish to find out more about as you become a more proficient addict.

Firstly, the program is more advanced than the documentation and so there is a great screed of changes, additions, deletions and 'please ignore' in a Readme file. However, it all seems to be there, if a little hidden or abbreviated at times. A perfect example of this is a nice little description for running it as a mail service on a local area network that uses all of one and a half tiny pages.

Conclusion

Tornado Notes is one of those programs that should be a compulsory acquisition for any person who uses a computer for much of their working day. It has a simple elegance and it works. Its usage for filing, cataloging via screen grabs of directories, to-do lists, records of ASCII codes and the like would only seem limited by your imagination. It is even reasonably priced. □

Product Details

Product: Tornado Notes

From: Micro Logic Corporation,
Hackensack, New Jersey USA

Distributor: Electro Magnetic Books,
PO Box 7177, Cloisters Square 6000 WA
(09) 384 2515

Price: \$95 taxed

Electro Magnetic Books has been importing Tornado Notes on a trial basis and selling it through Rellim Booksellers, located at 834 Hay St, Perth WA. For any enquiries about Tornado Notes, contact Electro Magnetic Books.

Functional Programming Languages

AN OVERVIEW

FUNCTIONAL Programming languages are currently an important area of academic research. They may well become the languages of choice for the fifth generation of computers. Functional languages are derived from the lambda calculus developed by Alonzo Church in 1936. Several of the more powerful recent functional languages rely heavily on Stephen Kleene's recursion equations which were also developed in the mid-thirties.

Without discussing the details of these mathematical formalisms we should note that because of their roots in mathematical logic, functional programs have several important properties not possessed by procedural languages like Basic, Fortran, Pascal and C.

If you'd like to investigate the power of functional programming at first hand, there are two Public Domain programs available . . .

Many proponents of functional programming languages consider that these languages offer the best hope for developing programs which will take full advantage of computers with many processors.

History

Lisp was designed by John McCarthy in 1960. Originally it was a pure functional language, but over the years it has evolved with a number of 'improvements' being made. Features such as assignment

Bob Finney considers the benefits of functional programming and its place in fifth generation hardware (and some examples of HOPE.)

to a variable have been added to make it a more efficient language for sequential Von Neumann machines. Lisp has been the language of choice of the artificial intelligence community.

More recently there has been a resurgence of interest in pure functional Lisp and Peter Henderson at Oxford University has developed an operating system and programming tools using LISPKIT.

NPL was an early functional programming language developed by Burstall and Darlington in 1974 and used to demonstrate that functional languages can be transformed and manipulated into equivalent, but superficially quite different, forms.

It has been used to specify the text formatter described in Kernighan and Plauger's *Software Tools*. The specification was then transformed mechanically into an efficient program implementation.

HOPE

HOPE is the successor to NPL, developed at Edinburgh University by Rod Burstall, Don Sanella and Dave MacQueen in 1980. HOPE is a strongly typed language which allows generic programs to be written which operate on several types of data. It is based on sets of recursion equations.

SASL (1976) was the first of a series of functional languages developed by Turner. SASL was followed by KRC (1981) and more recently by Miranda (1983). Miranda like HOPE is strongly typed and recursion based.

FP was introduced by John Backus in his ACM Turing Award Lecture of 1978: 'Can Programming be Liberated from the Von Neumann Style?'. FP has much of the flavour of APL but is a pure functional language. It has many adherents in the US.

FOL was developed by Bunemann and Frankel in 1979. This functional language may be used to formulate data base queries. Commercial FOL interfaces to CODASYL style data bases are available and are being used by salesmen to retrieve information from their companies' data bases.

The Benefits of Functional Programming

Procedural languages suffer from a malady called 'destructive assignment'. This means that variables are made to hold different values at different times during the execution of the program. This makes it very difficult to establish the 'correctness' of a program, to debug it. The order in which the statements of a procedural language program are executed is crucial to its success or failure.

In contrast, functional languages are said to be 'referentially transparent'. Basically, this means that the program does not depend on the order in which the statements are written or executed — we can re-order the execution of different parts of the program and will still get the same answer.

From the property of referential transparency come three benefits: Error free programs which satisfy their specifications are much easier to construct; programs can be transformed or manipulated just like equations to give new programs which might run faster or take up less

```

dec square: num -> num;           ! line1
--- square(n)  <=  n * n;         ! line2
square(7);                        ! line3

```

Listing 1. A HOPE program: Line 1 says 'square takes a number and yields a number', Line 2 says 'square(n) is defined as n multiplied by n', and Line 3 says 'apply square to the object 7'. When Line 3 is evaluated the result is '49:num.' (Refer to the text for an explanation of the symbols and functions.)

```

dec factorial : num -> num;       ! line1
--- factorial(0) <- 1;           ! line2
--- factorial(succ(n)) <- succ(n) * factorial(n); ! line3
factorial(7);

```

Listing 2. When run the program gives 5040:num. As in Listing 1, the first line declares the type of the arguments and the type of the result which will be returned. Lines 2 and 3 contain function definitions which cover the two possible cases. When the argument is zero, factorial(0) is defined as 1. If the argument is not zero we go to the second definition and evaluate the function by multiplying the argument by the factorial of its predecessor. This is a recursive definition and will only work if at some point the recursion 'bottoms out'. In this example this will always happen when we reach factorial(0) for which we have an explicit rewrite rule.

```

dec isin : alpha # list(alpha) -> truval; ! line1
--- isin(x, nil) <= false;                ! line2
--- isin(x, h::t) <= true  if x = h       ! line3
                        else isin(x, t);   ! line4

isin('a', "Your Computer");

isin(8, [2,4,6]);

```

Listing 3. An illustration of both the flexible typing and the pattern matching in HOPE — Line 1 declares alpha as a universal type, although in a given invocation it will always represent the same type. Line 2 declares the function isin to take an object of type alpha and a list of type alpha objects and return a Boolean value (truval). Lines 3 and 4 provide definitions of isin (the appropriate definition is found by pattern matching). When the list is empty, the definition in Line 2 is applied. Non-empty lists can be considered to consist of a head element 'h' and the rest of the list is the tail, 't.' Line 3 says if 'x' matches the first element in the list, return the value true, but if a match is not found apply isin to the tail of the list.

```

dec sort : list(num) -> list(num);
--- sort(nil) <= nil;
--- sort(x::y) <= insert(x, sort(y));

dec insert : num # list(num) -> list(num);
--- insert(x, nil) <= x::nil;
--- insert(x, y::z) <= x::(y::z) if x < y
                        else y::insert(x,z);

sort([2,6,9,1,5,7]);

```

Listing 4. An example of an insertion sort in HOPE illustrating how two functions can be combined.

GLOSSARY

Applicative Language: A language in which computations are carried out only by applying functions to arguments. There are no variables which are able to hold different values at different time during the life of the program.

Codasyl Database: A data base consisting of a network of linked records. This model has usually been employed with large databases.

Destructive Assignment: The operation of changing the value of a variable. In most conventional high level languages a variable is actually a named storage location. During the course of program execution the value held by the storage location may change many times.

Functional Language: Same as applicative language.

Lexical Analyser: A program which is able to partition its input into a sequence of units or tokens and output these sequentially. This type of program is always part of a compiler or test formatter.

Meta-Language: A language which has features which are outside the range of a given language in the sense that the meta-language can be used to prove or deduce properties about the lower level language.

Parallel Architecture: A computer system organisation in which many operations may be performed simultaneously rather than sequentially.

Predicate Calculus: A branch of formal logic theory which enables us to manipulate and prove theorems about individual parts (predicates) of a logical proposition.

Procedural Language: A language which describes how a computation is to be carried out. Basic, Pascal, Fortran and C are procedural languages.

Recursion: A set of operations in which one or more of the operations requires the whole set to be repeated. In programming this usually takes the form of a function which calls itself with a simpler argument. Functional languages use recursion rather than iteration constructs like: DO WHILE or NEXT loops.

Referential Transparency: The property that a variable or expression always denotes the same value. Functional languages have this property and this allows us to perform substitutions with expressions and to execute parts of an expression in any sequence. This is not the case where destructive assignment is allowed.

Transformation: The process of manipulating a functional program according to provable rules to give a program which looks quite different but performs the same actions.

Von Neumann Bottleneck: The inherent limitation of computers which use a single CPU to communicate with memory via a bus which is one word wide. □

space in memory; and, using a functional language will often cast a program in an inherently parallel form which can be exploited by machines with parallel architectures. (For a discussion of computer architecture and parallel architecture, see Roy Hill's 'Enter the Transputer' in YC, October '87.)

Fifth Generation Project

The Japanese Fifth Generation Project has adopted a version of Prolog for the software which is to be used on their parallel machines. Prolog, which is based on predicate calculus, is also referentially transparent.

In the UK, work on parallel architectures has been underway at Manchester University for some years, and more recently the Alice project at Imperial College has just completed a prototype parallel graph reduction machine using INMOS transputers. This 16-processor computer uses a special custom high speed switching chip to handle the communications between the transputers. The aim is to produce a VLSI version of Alice (Applicative Language Idealised Computing Engine) by 1989.

The Imperial College group hope to exploit the benefits of a marriage between parallel architectures and pure functional languages. These are seen as: clear concise programs; program development by formal (and therefore 'mechanisable') correctness preserving program transformation; and parallel evaluation giving greater speed of execution.

At present, the software environment which has been developed consists of a 7000-line HOPE compiler written by Ian Moor; a meta-language transformation system for transforming specifications into executable programs; a HOPE syntax editor; a syntax directed editor for other languages; a text editor (ECCE); graphics packages; an interactive income tax advisor; a lexical analyser generator; and a Prolog parallel interpreter.

The HOPE Language

A HOPE program (see Listing 1) consists of a set of data definitions, a set of function definitions, and a top level expression which, when evaluated, gives the output of the program. The main program and data definitions are —

X or # — and,
-> — yields,
<= — is defined as,
— — the value of,
== — is defined as (data), and
++ — or.

These are the constructor functions which are the most primitive HOPE functions —

, — tuple constructor,
: — joins an object to a list of the same type of object,
nil — an empty list,
0 — the value zero, and,
succ() — the successor of.

Some of the functions builtin into the HOPE compiler —

+ — plus,
- — minus,
* — multiply,
div — divide,
mod — mod,
= — equals,
< — less than, and
> — greater than.

A second example of a HOPE program is given in Listing 2 — note that the appropriate definition to use in evaluating the top level expression is found by a pattern matching mechanism; in this respect the language has some similarity to Prolog, although Prolog's pattern matching is more powerful.

The appropriate definition to use in evaluating the top level expression is found by a pattern matching mechanism and in this respect the language has some similarity to Prolog, although Prolog's pattern matching is more powerful.

Listing 3 illustrates both the flexible typing and the pattern matching in HOPE. Running the program produces —

```
true: trueval
false: trueval.
```

Execute the programs on paper yourself to verify that repeated application of the definitions will eventually establish a value of true or false.

Finally, Listing 4 is an example of an insertion sort which illustrates how two functions may be combined. Running the program in Listing 4 gives —

```
[1,2,5,6,7,9]:list(num).
```

If you'd like to investigate the power of functional programming at first hand, there are two Public Domain programs available — a HOPE interpreter which runs on IBM compatible machines under MS-DOS, and a version of FP which is also for IBM PC clones. I will be happy to supply copies of these programs for a charge of \$15 each to cover the cost of handling, copying and the disks. Simply send a cheque or money order to Functional Programs, care of *Your Computer*, PO Box 227, Waterloo 2017. □

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HYPE

about HyperCard, Hypertext and Hypermedia

THE COMPUTER world today probably has as many gurus as pop music and pop philosophy combined. These legendary computerised figures stalk the stages of high-tech conferences – destined evermore to be 'keynote speakers' sprouting futuristic philosophies and fantastic dreams.

One such figure recently re-emerged from his digital dungeons is Ted Nelson, the man who invented the terms 'hypertext' and 'hypermedia', and who authored *Literary Machines* trying to explain it all.

'We speak sequentially because we have only one vocal track and we write sequentially because books have numbered pages, but we don't think sequentially,' says Nelson.

It is the rigidity of database structures that he is attacking; the way in which we create records with dependent fields, and link them hierarchically into files.

Nelson envisages future databases as free floating packages of information (text, graphics, audio or video information) all interconnected by multi-dimensional links. His theory also involves the ability for each user to 'customise' their own database – in effect create their own links – so authoring tools are an essential part of hypertext.

Hypertext (or nowadays more properly 'hypermedia') concepts in the design of software would enable us to freely explore information in 'multiple parallel' paths, instead of being confined to a fixed path or structure, Nelson predicts. His Project Xanadu in the States has the rather fanciful aim of linking and cross-linking *all* of the world's information. You heard it right – *all*!

I met him three months ago in Seattle at the CD-ROM conference and we talked about hypertext for about an hour. But only on our second meeting, after a long hands-on session with OWL International Incorporated's CD-Guide hypertext system for CD-ROM based applications, was I able to get to grips with the concept.

Stewart Fist waxes lyrical on hypertext – a flexible, programmable information retrieval system quite unlike anything we've seen before.

I must admit that at first I thought Nelson was tending to confuse computer programming with some exotic Eastern religion or the Californian cult of EST. It is the philosophical abstractions that interest Nelson, not the nuts-and-bolts means of actually making computers work.

He is not the world's best explainer, and he deals in an area with difficult concepts and very few useful analogies. The other problem in understanding him is that hypertext is a 'normative direction' rather than a product or a design; it is a statement of aims about how things ought to be. The fact that these ideas have been around for over 20 years (since 1965 at

least) is an indication of how difficult even the basic concepts are to achieve.

To get to grips with hypertext, you'll have to play with the software yourself – Melbourne-based Pica has managed to quietly import OWL's CD-Guide (for the Mac and IBM), and Apple is here with HyperCard. I promise you: these new products are the next wave of species software – like desktop publishing (DTP), expert systems and so on.

HyperCard is for the Macintosh, and Apple is swinging a lot of weight behind it. In fact Apple is bundling HyperCard software with every Mac sold, and if you've already spent your money on an old Mac, you can get a copy from an Apple dealer for under \$100.

These two programs are only the first of a long line of future hypertext software – quite possibly in a few years these products will appear as primitive as VisiCalc does now. But they are very important products in the evolution of computers: like the cuckoo that heralds spring, I believe that HyperCard is the harbinger of 'informatics' with computers – as distinct from data processing.

I've been waxing pretty lyrically of late in these and other magazine pages about the imminent impact of CD-ROM and expert systems: now we have the third corner of the informatics triangle, a flexible, manipulatable, programmable information retrieval (pathway?) system quite unlike anything we've seen before. From today, the world is different.

CD-Guide

Let me give you some examples. First of all, OWL International's CD-Guide for the Macintosh and for the IBM PC (under Windows): this is a shell, much like the expert system shells, into which people put information on a subject. This information constitutes the 'database' – but it can be any type of information, it is not just limited to text and/or graphics.

CD-Guide allows readers to interac-

Behind HyperCard

IN OUR JULY issue, Stewart Fist starts a four part tutorial on HyperCard – 'There are quite a few computer journalists more enthusiastic than I am about HyperCard – and yet I think it's one hell of a program. Gareth Powell at the Sydney Morning Herald, for instance, promotes it as the most important program of the decade. I'm not sure that I would go out on a limb this far, but HyperCard is obviously revolutionary ... and also interesting. So even if the revolution fizzles, the fascination might remain.'

One thing is for sure; you are not going to waste your time by learning about HyperCard. At the very least it is certainly the foretaste of programs to come.'

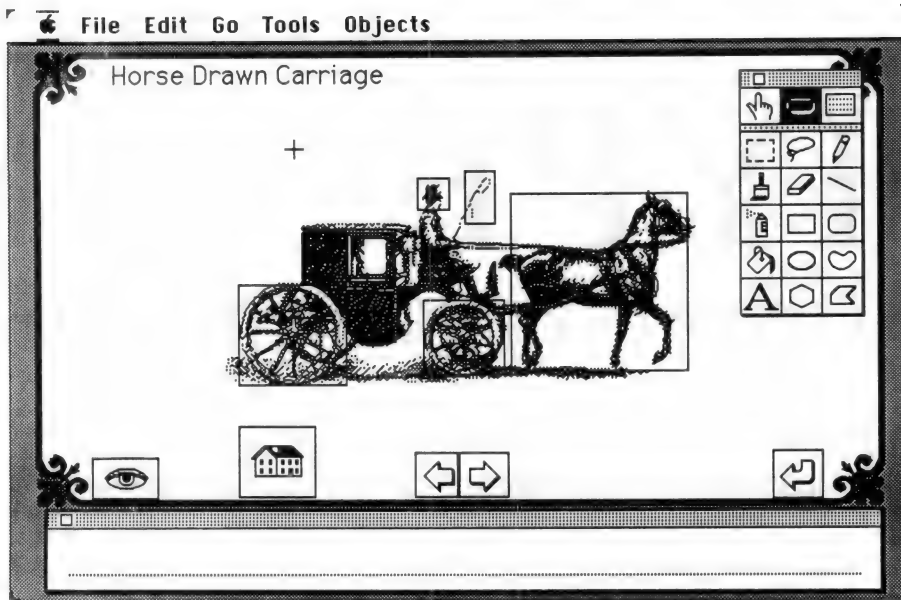


Figure 1. An illustration from a Hypercard demonstration stack showing the 'live' areas within an illustration. Clicking on the hat, in this case takes you through to where you get other types of hats.

tively explore information and allows them to 'tailor documents to their individual needs' by simply clicking on 'buttons' embedded in the documents. CD-Guide is a very early form of hypertext-type software but it does incorporate the powerful free form linking of text which is one of the basic concepts of the idea.

There are no commands; the entire user interface consists of either a one-button mouse (or a touch screen) so you can learn to use CD-Guide in a minute. You point and click on 'live' words, or mini-icons, or buttons, or objects within the screen to obtain the information you want.

CD-Guide grew out of a previous hypertext software product called Guide, which could be crudely and inadequately described as a cross between a word processor, a database and an idea processor. Its primary purpose is to present information interactively on the computer screen, but it can also be used to prepare printed documents.

The new software species of 'ideas processors' gets closer to hypertext than any other, I think. If you own ThinkTank or More, you'll understand what I mean. Each layer of the outline can have another layer behind, and these layers are directly related (tightly linked) to the layer above. If I click my mouse on a subject heading, that heading will 'open up' and reveal a series of sub-headings beneath – or at the final stages it will reveal some explanatory text.

Idea processors are essentially tree-structured. From the main heading, the tree branches into (makes connections with) sub-headings, sub-sub-headings and so on until it reaches the explanatory text at the leaf end.

True hypertext is not like this. It is a web-structure with all pieces of information having the same standing in the hierarchy, but with the ability to establish links of any kind, and to any degree.

For instance, suppose you were reading this text on a CD-Guide hypertext system – it would appear much as it does now. But if you were to pass your cursor over the text you would discover that certain parts of the text were 'live' – which simply means that the cursor would change to indicate that other data was linked to this word.

In the above paragraph the words 'CD-Guide', 'hypertext' and 'cursor' would probably be alive. If you were to click on these words, you would be instantly provided with other relevant information. In the case of 'cursor' it might only be a brief dictionary definition which would appear in the small window on the screen, but there could easily be another depth of explanation below this again which would take you into technical programming information about how cursors are controlled.

In this case the window would possibly have a selection menu which would let you choose whether you wanted to go into the programming data, or perhaps into a

graphic screen illustrating different types of cursor styles, or whatever. The range of possibilities depends on the available information, and the links that you or the content provider have established – not on the limitations of the software.

If you clicked on 'CD-Guide' it might initially provide you only with the basic information about the programmers, OWL International Incorporated, with its address and telephone number. But you would probably also have an opportunity to pass through this window into one or more magazine reviews of the software; or lists of dealers; or a discussion on hypertext as a philosophy.

You might go down the yellow brick road of any of these pathways, clicking on live words as you go, and never get back to the original article – or you might go part of the way, then click on a 'return' button, and zap back to the paragraph you left.

The analogy here is probably very close to adventure games – although these tend to be rigid in structure with randomised sections. In fact, my first reaction on seeing Apple's HyperCard demonstration was just that; it provides the shell for a marvellous series of discovery games – so there is a lot of opportunity here for educational software writers.

HyperCard

Apple's HyperCard was rumoured for about five years – you may have heard it whispered about under the name Wild Card. Bill Atkinson the creator of MacPaint did the coding, and he is said to have spent four years just getting the user interface right.

HyperCard uses 'stacks' of 'cards' to store and sort information in a manner very similar to Xerox's Note Card program. It is obvious where the metaphor has come from, and the object-oriented control language also is derived from Small Talk.

Everyone in the reviewing business is having trouble describing HyperCard. See if these make sense: 'It is a multi-media database toolbox which can contain text, sound and graphics.' Or this, 'It can be best described as a non-linear way of tracing various aspects of a concept or feature, with multiple options at each step'.

Or Apple's press release, which says 'HyperCard is a software-based toolkit that gives users the power to use, customise and create new information using multiple information types such as text, graphics, video, music, voice and animation'.

I think you get more of an idea out of my just saying it is 'a serious adventure

game'. Remember that HyperCard, like CD-Guide, is a shell. It is an empty stack of cards into which you must put text, or graphics or even music.

If we are talking about CD-ROM as being the source of the information for that shell, then there will need to be a substantial input of text, graphics and information to fill the 600-odd megabytes of disk space. So HyperCard will probably establish a new information industry, which will be part-way between librarianship, computer programming, and expert-system type knowledge engineering.

Don't get the idea though, that HyperCard is dependent upon CD-ROM, or on encyclopaedia-type information. You can use the system to store and interconnect your own information – although I personally doubt whether people will go to the bother for mailing lists and suchlike after the novelty wears off.

I think HyperCard will find a place somewhat analogous to DTP within large companies (and as small service businesses), where a couple of people work together designing and constructing customised HyperCard applications. One thing is sure: HyperCard will eventually boost the sale of video digitisers and optical character readers (OCRs). These are the easy ways of handling large amounts of text and graphic information already in existence.

Let's get down to the nuts-and-bolts of HyperCard.

It consists of three disks plus a backup. There's a main HyperCard disk with several example 'stacks', a Help disk and a Stack Examples and Ideas disk. The main disk comes with a few desktop 'stacks' for an address file, a datebook, a 'to do' list, calendars and a filing system, while the Ideas stack gives you hundreds of stack templates, card designs and clip-art drawings. There is also a 225-page user tutorial and reference manual.

As a minimum, you'll need a 1 Mbyte Mac Plus with two 800 kilobyte floppies, although a hard-disk would be even better. The program itself takes up 368 Kbyte on disk, and there's not much point in using it unless you've got a reasonably large amount of data.

HyperCard can be used as a front-end to drive a CD-ROM disk unit or any other form of mass storage, and it will also have primitive communications – for instance the music system can be used for touch-tone dialing. Later versions will undoubtedly expand this capability.

I've seen a demonstration of an information package called Business Class which starts with a map of the world, then lets

8/4/87 10:58 AM

Background Script

```
on idle
  if field "Time" is not the time
    then put the time into field "Time"
  repeat while the hour = it
    exit idle
  end repeat
world
put the hour into it
end idle

on openCard
  put the hour into it
end openCard

on ArrowKey left
  go next card in this background
end ArrowKey left

--on ArrowKey right
-- go previous card in this background
--end ArrowKey right
```

Figure 2. An example of the HyperTalk structured object-oriented language derived from SmallTalk.

you move in progressively on any country, or city. Finally at the city level it gives you information such as hotels, exchange rates, cultural activities, transport, climate and so on.

There are a couple of calculator functions builtin to HyperCard, so you can change Fahrenheit to Centigrade. Obviously at a later time you will be able to go on-line to your bank and automatically update and do currency conversions.

As I see it, well-designed hypertext systems will become the central point of our new high-information world. Up until now we have been concentrating on data processing, and word processing – now we are into the age of Informatics with real information processing.

Hypertext systems will be able to access data on CD-ROM disks and update this from online links. They will also possibly act as the bridge between program modules that provide word processing, ideas processing, spreadsheet, and communication functions.

I doubt whether we will see elaborate hypertext systems for Apple IIs and the IBM PC range, mainly because you need the speed of the new 32-bit chips to make these intricate database management functions possible without excessive delays. We will also need the addressing range of the 32-bitters to provide the

working space necessary for large databases – and without these hypertext is largely unnecessary.

Add to this the value of good quality graphics and multivoiced sound, and you can begin to predict where this is all going to happen in the PC world.

Obviously the Mac SE and Mac II are the desktop machines which hypertext will benefit the most – and Apple hasn't been slow to see the opportunities. But hypertext is also a system for mainframes and minis, and so a combination of PC terminals accessing on-line hypertext systems might be the way most of us will use hypertext. □

Product Details

Product: CD-Guide
From: OWL Incorporated
Distributor: Pica Pty Ltd, 38 Ardoch St, Essendon 3040 Vic.
 (03) 370 3566
Price: Pica to ring back

Product: HyperCard
From: Apple, 6 Rodborough Rd, Frenchs Forest 2086 NSW
 (02) 952 8000
Price: HyperCard is bundled with the Macintosh range

MOUSE TRAPPING

for programmers

Malcolm Greer decided to let us in on his secret for trapping rodents (the electronic variety).

WITH THE RAPID increase in electronic rodent population, the need to program the little devils to behave is often felt by programmers. How to contain a mouse even with a DB9 tail is just a matter of having the right tools (perhaps traps?).

Most of the current breed of mice have some compatibility with the Microsoft version, or at least will use the same functions. This includes such rodents as Logitech, Witty, and the PC Mouse. However, the functions available for controlling a mouse are normally only given in either Microsoft's *Mouse Programmer's Reference Guide* or the Logitech *Mouse Programmer's Reference Manual* – both of which are only available with the mouse. The poorer versions of mice come with none of these references and, in many cases, without a driver.

A driver is needed to allow the mouse to interface with the bios and to provide a collection of routines that turn mouse action into program action. Without these the mouse is just a dead rodent. The driver is normally a .SYS or .COM file and can be added to Config.sys as a device driver, for installation at boot time, via a line in the file such as –

```
DEVICE = Mouse.sys /1
```

Note that the Slash 1 or 2 is used by some serial mice to determine which serial port it will operate on. The .COM file can be used as a normal program to install the mouse when wanted, or placed in your Autoexec.bat file.

Both means install the mouse driver to enable the computer to use the device as input. Also contained in the programs supplied with the more expensive mouse are menu builders which enable you to create menus for use with programs that have no mouse support. These usually require a separate program to be run to load the menu before using the program you really want to use.

Support builtin

While the methods mentioned give mouse support, it is better to be able to directly control your mouse from the program you have written. This gives a much more flexible input to your programs and puts the professional finish on. But how to do it?

There are 24 functions supported by the mouse interrupt 51, which Microsoft uses. Since most other mice are compatible, they, too, can use the same functions. The functions are numbered 0-16, 19-23, 29 and 30, and using them allows some very powerful program interfaces to be written. The functions are listed in Table 1.

0	Reset driver and read status
1	Show mouse cursor
2	Hide mouse cursor
3	Return position and button status
4	Position mouse cursor
5	Return button press data
6	Return button release data
7	Define horizontal cursor limits
8	Define vertical cursor limits
9	Define graphics cursor
10	Define text cursor
11	Read motion counters
12	Define interrupt routine parameters
13	Light pen emulation on
14	Light pen emulation off
15	Set mickey/pixel ratio
16	Define screen register for updating
19	Define double speed threshold
20	Exchange interrupt subroutines
21	Return driver storage parameters
22	Save driver state
23	Restore driver state
29	Define display page number
30	Return display page number

*2B LOGITECH function to return version

All mouse functions are accessed via interrupt 51, an unused interrupt that Microsoft claimed for the mouse. The registers used are AX, BX, CX, DX and, in some special cases, ES. These can be accessed via Assembly language, Basic, Pascal or C and versions of their use will be presented elsewhere in various languages.

Show a cursor

The mouse cursor is a separate cursor to the normal onscreen text cursor so the device can show where it is pointing to. There are four functions which give control over the shape and type of cursor – functions 1, 2, 9 and 10.

Table 1. The 24 functions supported by the interrupt 51, claimed by Microsoft for the mouse.

Screen Mode	Description	Virtual Size	Physical Size
0	40 col text	640 * 200	16 * 8 cell
1	40 col text	640 * 200	16 * 8 cell
2	80 col text	640 * 200	8 * 8 cell
3	80 col text	640 * 200	8 * 8 cell
4	graphics	640 * 200	320 * 200
5	graphics	640 * 200	320 * 200
6	graphics	640 * 200	640 * 200
7	80 col text	640 * 200	8 * 8 cell

Table 2. The relationships for the virtual and physical screen layouts on the IBM screen.

This cursor is directly linked to the mouse driver, which takes care of all the movement over the display as the mouse is moved with no attention required from the application using it. There are three different cursors which can be used via these functions – the graphics cursor, the software cursor and the hardware cursor. The graphics cursor can only be used in graphics mode while in text mode both hardware and software cursors can be used.

Functions 1 and 2 are used to turn the cursor on and off and this can be done by two statements –

```
MOV AX,1    ;turn cursor on
INT 51      ;do interrupt
```

Setting AX to 2 before the interrupt call will turn off the cursor. Functions 1 and 2 increment or decrement an internal flag which decides if the cursor is to be displayed.

Functions 9 and 10 are used to change the appearance of the cursor. Function 9 determines the shape of the graphics cursor and must have three parameters passed to it. The first is the screen and cursor masks and is placed in the ES:DX register pair. The cursor mask must immediately follow the screen mask in memory; both arrays are used together to define the shape and colour of the cursor.

The process simply makes sure the cursor contrasts with the background so it can be seen. Technically both arrays are made up of 16 words. The driver first logically ANDs the video memory with the screen contents and then performs an XOR with the cursor mask. Any screen pixel that is set to bit 0 is turned off and then any pixel which is paired against a 1 in the cursor mask is inverted.

Masks (mouse incognito?)

The usual way to set up the masks is to set all bits in the screen mask to 1 (that is to say 16 values of FFFFh) and to describe the cursor shape by setting the desired pixels to 1 in a field of 0s. A picture is easier, so here's an example from Microsoft's *Programmer's Reference* –

```
8000h 1000000000000000
E000h 1110000000000000
F800h 1111100000000000
FE00h 1111111000000000
0800h 1101100000000000
0C00h 0000110000000000
0600h 0000011000000000
0300h 0000001100000000
0000h 0000000000000000
0000h 0000000000000000
0000h 0000000000000000
0000h 0000000000000000
0000h 0000000000000000
0000h 0000000000000000
0000h 0000000000000000
0000h 0000000000000000
0000h 0000000000000000
```

```
#include "dos.h"

/* clear the screen */
void cls()
{
    union REGS r;

    r.h.ah=6;    /*screen scroll code*/
    r.h.al=0;    /* clear screen code */
    r.h.ch=0;    /* start row */
    r.h.cl=0;    /* start column */
    r.h.dh=24;   /* end row */
    r.h.dl=79;   /* end column */
    r.h.bh=7;    /* blank line is black */
    int86(0x10, &r,&r);
}

/* end of function cls() */
```

```
int mouse_call(int m1, int m2, int m3, int m4)
```

```
{
    union REGS mice;

    mice.x.ax = m1;
    mice.x.bx = m2;
    mice.x.cx = m3;
    mice.x.dx = m4;
    int86(0x33,&mice,&mice);
}

main()
{
    char ch;
    unsigned int mouse_char;
    int i,m1=0,m2=0,m3=0,m4=0;

    /* check to see if mouse driver is installed first */
    cls();    /* clean up the screen */
    mouse_call(m1,m2,m3,m4);
    if (i _AX) /* use pseudo variable to get result in ax */
    {
        printf("Mouse driver not found .....\n");
        exit (0);
    }
    else
        printf("Mouse driver is installed\n");

    /* Now turn on the mouse cursor to show it */

    m1 = 1;    /* function 1 */
    mouse_call(m1,m2,m3,m4);

    /* Now set up software cursor */
    m1 = 10;    /* function 10 */
    m2 = 0;
    m3 = 0x77ff;
    m4 = 0x7700;
    mouse_call(m1,m2,m3,m4);

    /* now prepare to receive a mouse press and determine it */

    m1 = 3;    /* function 3 */
    do {
        mouse_call(m1,m2,m3,m4);
        mouse_char = _BX;    /* bx has the button code */

        switch (mouse_char)
        {
            case 1:
                printf("left pressed\n");    /* replace this section with */
                for (i = 0; i < 25000; i++); /* time delay to slow up C */
                break;    /* the code you wish buttons to */
            case 2:    /* complete.. */
                printf("right pressed\n");
                for (i = 0; i < 25000; i++);
                break;
            case 3:
                printf("right & left\n");
                for (i = 0; i < 25000; i++);
                break;
        }
    } while (mouse_char != 4);    /* a way to quit */

    /* RESET MOUSE DRIVER TO POWER UP STATE BEFORE EXITING */
    m1=0;
    mouse_call(m1,m2,m3,m4);
}
```

Listing 1. A simple demonstration for mouse interfaces using the register routines and DOS interrupt 51 calls. It returns the codes for button presses left, right, and left and right. Pressing the middle button will quit the program. See the Turbo Basic program in Listing 2 for more detail.

Listing 2. This routine uses Turbo C to directly issue the register values. Pseudo variables have been used to access the return values later in the main section for demonstration.

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Taking a close look at this reveals the shape of the common arrow pointer used by many programs to indicate mouse position.

The other two parameters passed are the cursor point that determines the cursor address. The horizontal co-ordinate is entered in BX, the vertical co-ordinate in CX. The arrow shape above would commonly use the point of the arrow as the position used to determine cursor address. If it assumed that ES is pointing to a segment containing the screen and cursor mask, then the following Assembly statements would give the mouse arrow with the top left corner as the cursor position point –

```
MOV  AX,9           ; SET UP GRAPHICS POINTER
MOV  BX,0           ; HORIZONTAL COORDINATE
MOV  CX,0           ; VERTICAL COORDINATE
MOV  DX,OFFSET MASK; LOAD THE ARRAYS
INT  51             ; GO !
```

For something a little more simple, function 10 is used for the text cursor when the mouse is operative. Remember, there are two cursors available for text, the software cursor and the hardware cursor. Function 10 is called with BX set to 1 to set the hardware cursor, while 0 will set the software cursor.

The hardware cursor can be changed to size by passing the start scan line in CX and the finish scan line in DX. This simply means you can have from one to eight lines for a mouse cursor.

The software cursor is called with 0 in BX and a screen mask in CX, with a cursor mask in DX. The mask is similar to the graphic mask, with each mask being a word in length (16 bits). This matches a character/attribute pair in video memory. The function first ANDs the character at the cursor location with the screen mask and then XORs this with the cursor mask. The following code segment leaves the ASCII code of the character on screen as is but inverts the foreground and background colours that produces a reverse effect –

```
MOV  AX,10          ; the function number
MOV  BX,0           ; select software cursor
MOV  CX,77FFH       ; screen mask value
MOV  DX,7700H       ; cursor mask value
INT  51
```

The driver looks after the problem of moving the cursor to a new location by restoring the old values for the character at the old location.

Listing 3. The Turbo Basic subroutine to draw a box section on screen using the upper left and lower right co-ordinates and to specify the border colour.

```
$include "regnames.inc"
'Standard TurboBasic include file

'NOTE MODIFICATIONS FOR MONOCHROME delete the parameter bdccl and
'the last number in EACH screenbox call.

sub ScreenBox(leftx,lefty,rightx,righty,bdccl)

    color bdccl,0           ;'delete for mono screen
    locate lefty,leftx      ;'start at top left corner
    print chr$(201)
    x1 = leftx+1
    for x = (x1) to (rightx - 1)      ;'complete top line
        locate lefty,x
        print chr$(205)
    next x
    locate lefty,rightx:print chr$(187);'right side of box
    for y = (lefty+1) to (righty-1)
        locate y,rightx
        print chr$(186)
    next y
    locate righty,rightx: print chr$(188);'bottom line for box
    for x = (rightx-1) to (leftx+1) step -1
        locate righty,x
        print chr$(205)
    next x

    locate righty,leftx: print chr$(200)      ;'left side of box
    for y = (righty-1) to (lefty+1) step -1
        locate y,leftx
        print chr$(186)
    next y

end sub

sub MOUSE (n1%,n2%,n3%,n4%)

    shared m1%,m2%,m3%,m4%           ;'shared so we can use in main program

    reg %ax,n1%                     ;'set up the registers with correct
    reg %bx,n2%                     ;'values. This is a feature of Turbo
    reg %cx,n3%                     ;'Basic as is the subroutine.
    reg %dx,n4%
    call interrupt 51               ;'Call the mouse driver interrupt

    m1%=reg(1):m2%=reg(2):m3%=reg(3):m4%=reg(4) ;'Assign return values

end sub

' MAIN SECTION OF PROGRAM BEGINS HERE.

color 2:cls                       ;'delete color statement for mono
    locate 2,10
    print "MOUSE TESTING PROGRAM"
    CALL ScreenBox (7,1,49,4,2)

' This section initialises mouse after checking for mouse driver loaded.
' THIS IS THE NORMAL MEANS FOR USING IN GWBASIC not needed for turbo.
' Get Mouse Interface Address
' DEF SEG=0
' MSEG=256*PEEK(51*4+3)+PEEK(51*4+2)
' MOUSEmem=256*PEEK(51*4+1)+PEEK(51*4)+2
' IF MSEG<>0 AND MOUSEmem<>2 THEN goto (linenumber??)
' PRINT "MSMOUSE Driver not Found":END

' Initialize the Mouse

M1%=0
CALL MOUSE(M1%,M2%,M3%,M4%)
IF NOT(M1%) THEN PRINT "MSMOUSE driver not installed":END
locate 3,10:print"Mouse driver found and operational....."
' Now turn on the mouse cursor

m1%=1
call mouse(m1%,m2%,m3%,m4%)

' Define the Software Cursor

M1%=10: M2%=0: M3%=&H77ff: M4%=&H7700
```

Seeking mouse position

To actually track or locate the mouse on screen is the purpose of functions 3, 4, 7 and 8. To do this, the mouse 'thinks' in terms of a virtual screen, which is somewhat different to what you are looking at on screen, depending upon what screen mode the computer is operating in. A virtual screen for the IBM is 640 x 200 pixels. However, in text modes what is actually visible is a series of 8 x 8 cells (for a 80 column text mode). This simply means the mouse adjusts the value it returns for a location by compensating for the screen mode being used.

Assuming mode 5, a graphics mode with a screen pixel of 320 x 200, requires adjusting, since the mouse is thinking in terms of a virtual screen of 640 x 200 pixels. Therefore, if a location is requested from the screen then the mouse will only return an even number. If the mouse was located at a pixel with a horizontal co-ordinate of 66 and the mouse was shifted right horizontally to the next location the position would now be 68, an even increase.

Text modes 2 and 3 use an 8 x 8 cell and therefore the mouse will return position values in multiples of 8. The relationships for the virtual and physical screen layouts on the IBM screen are given in Table 2.

Function 3 is a dual purpose function for returning both the mouse cursor location and the button status (detailed later). To find the exact location of the cursor on screen for a menu selection perhaps requires the following –

```
AX = 3
BX = button status
CX = horizontal cursor position
DX = vertical position
```

To position the mouse cursor on screen is the task of function 4. Remember, the mouse is working on a virtual screen and compensation must be made for the screen mode being used. To locate the cursor at the center of an 80 column text screen then the following could be used –

```
MOV     AX,4
MOV     BX,0           ;this value is ignored
MOV     CX,320         ;the horizontal position
MOV     DX,96          ;the vertical position
INT     51
```

Now that the cursor is located, it would be useful to limit the amount of screen it can operate in (for menus and suchlike). This is the job of functions 7 and 8. These are used to set the maximum and minimum values for the horizontal and vertical values, respectively. Both functions pass

```
CALL MOUSE(M1%,M2%,M3%,M4%)
;
;   Position Cursor to middle of screen
;
M1%=4
M3%=320: M4%=99                      ;'virtual screen coordinates
CALL MOUSE(M1%,M2%,M3%,M4%)

;   define the mouse speed
m1%=15:m2%=0:m3%=16:m4%=32
call mouse(m1%,m2%,m3%,m4%)

;lock the mouse cursor into a central boxed area for test
;the box will start at 50,220 to 150,420 mickys
;this equates to 6,25 to 12,52 box pattern

call ScreenBox (27,6,54,19,3)

m1%=7:m3%=220:m4%=420                ;'set up horizontal size
call mouse(m1%,m2%,m3%,m4%)

;set up vertical
m1%=8:m2%=0:m3%=50:m4%=142
call mouse(m1%,m2%,m3%,m4%)

;   Now set up function call 3 for button status
m1%=3

;   Now for the screen layout messages

call ScreenBox(27,17,34,19,2)
locate 18,29:print "Quit"
    call ScreenBox (1,20,66,23,3)
    color 2

do
    call mouse(m1%,m2%,m3%,m4%)
    locate 21,2
    print "x co-ordinate = ";int(m3%/8)+1;"y co-ordinate = ";int(m4%/8)+1;"
    locate 22,2:print "Across.. ";m3%;" Vertical >>";m4%
    locate 22,36:print"Button Status"
    locate 5,2:print "Button code return ";int(m2%)
    select case m2%
    case 1
        locate 22,50:print "left pressed":locate 3,10:print "Button operational
    case 2
        locate 22,50:print"right pressed ":locate 3,10:print "Button operational
    case 4
        locate 22,50:print"middle pressed":locate 3,10:print "Button operational
    case else
        locate 22,50:print"
    end select
;This section checks on mouse cursor location
    select case m4%
    case 50 to 150
        select case m3%
        case 200 to 250
            if m2%>0 and m2%<5 then goto endprog
        end select
    end select

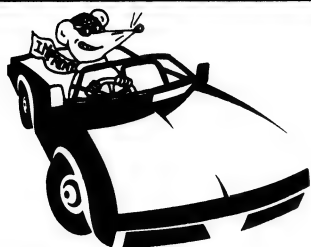
loop

endprog:
    m1%=0
    call mouse(m1%,m2%,m3%,m4%)
    cls
    locate 4,1:print "End of Testing Pattern"

end

;The program should be compiled to a .EXE file for maximum performance.
```


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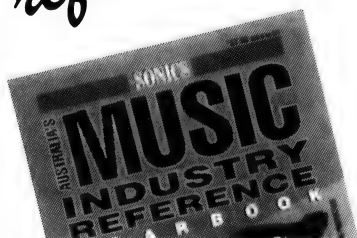


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the minimum position in CX and the maximum value in DX. The following would limit the mouse cursor movement to the upper right screen section in an 80 column text screen –

```
MOV AX,7      ;set up horizontal limits
MOV CX,320    ;center of line
MOV DX,640    ;end of line
INT 51
MOV AX,8      ;set up vertical limits
MOV CX,0      ;top of screen
MOV DX,100    ;center of screen
INT 51
```

Tickle the digits

Having accomplished the location of the mouse, it means the rodent should be able to do something with the buttons protruding from its hide. Functions 3, 5 and 6 provide a wealth of information on what is happening. Now for a little sidetrack – mice come with different numbers of digits. Microsoft has only two, while many of the others are blessed with three. Many drivers ignore the third button as a useless appendage, but this can be put to good use with the functions listed. For those with only two buttons ignore the reference to combinations using the third button.

Function 3 returns the button status in the BX register and by checking this register it is possible to determine which button was pressed. Functions 5 and 6 go one step further by detailing whether a button was pressed down or released. Now you know how those programs allow selection and drag without operation until the button is released.

The mechanics are quite simple – function 3 returns a number in BX corresponding to the button pressed and released. The actual layout is –

- 1 – left button
- 2 – right button
- 3 – right and left buttons
- 4 – middlebutton
- 5 – middle and left buttons
- 6 – middle and right buttons

Function 5 can be used to check a particular button press by placing the button code in BX. The code used is as for function 3. The button status is returned in AX in the form of a bit mask. The mask is a value found by adding which bits are on. In fact, function 3 also uses the same bit pattern. The lower bits are used with the rest being ignored –

A little binary maths shows the following results –

- bit 0 set(1) value 1 – left button pressed
- bit 1 set value 2 – right button pressed
- bits 0 and 1 value 3 – left and right pressed
- bit 2 value 4 – middle button pressed

- bits 0 and 2 value 5 – middle and left pressed
- bits 1 and 2 value 6 – middle and right pressed
- bits 0, 1 and 2 value 7 – all three buttons pressed

Function 6 uses the same layout except it gives information on button releases.

Resetting the mouse

Function 0 is used to initialize the mouse in the power up condition and also enables the program to determine if, in fact, the mouse driver is present. It will also return the number of buttons present on a particular mouse (Microsoft compatible, remember). The most common use is to determine the state of the mouse driver software, present or unloaded, and should be used as the first operation. All that is required is an 0 in AX and the function will return a 0 if the mouse software is not loaded or a ?1 if it is present. BX returns the button code as 0 for 2 buttons with a -1 for more than two.

Function 0 when called will reset the mouse cursor to the center of the screen with the cursor off and maximum and minimum limits set for the entire screen.

Now see how mice run

There are several other useful functions which can be used to enhance mouse operations. Function 12 is of particular interest, in that it allows user interrupt routines to be written. Now you know the rudiments of rodent control there is no reason to have a restricted appendage to your keyboard.

I have also included a program using Turbo Basic for a simple mouse test program employing some of the functions mentioned as a guide to use (see Listing 2). The program stubs for using TurboC are included as Listing 3. Both programs check to see if the driver is present. The Turbo Basic program also displays the screen co-ordinates and virtual screen coordinates for an 80 column text screen.

To run the program with GWBasic would require some rewriting, however to use the mouse itself is almost identical as far as calling the interrupt. First you must include the initialization code –

```
10 DEF SEG=0
20 MSEG=256*PEEK(51*4+3)+PEEK(51*4+2)
30 MOUSE=256*PEEK(51*4+1)+PEEK(51*4)+2
40 DEF SEG=MSEG
```

Now having completed this it is a matter of assigning the correct values to the variables and using the CALL statement –

```
CALL MOUSE(M1%,M2%,M3%,M4%)
```

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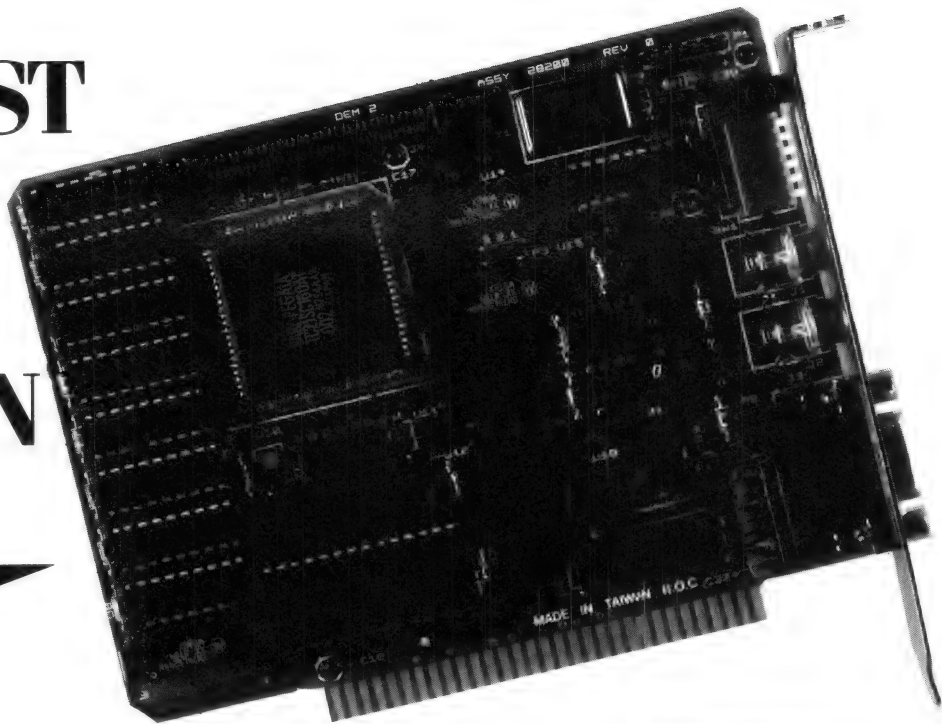
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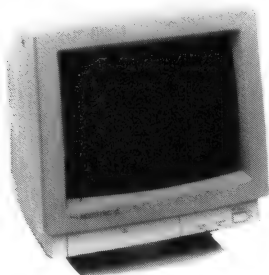
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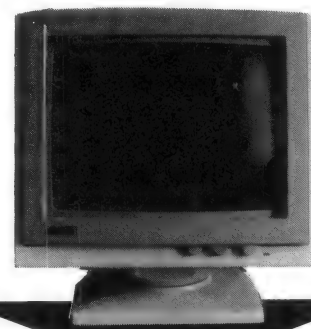
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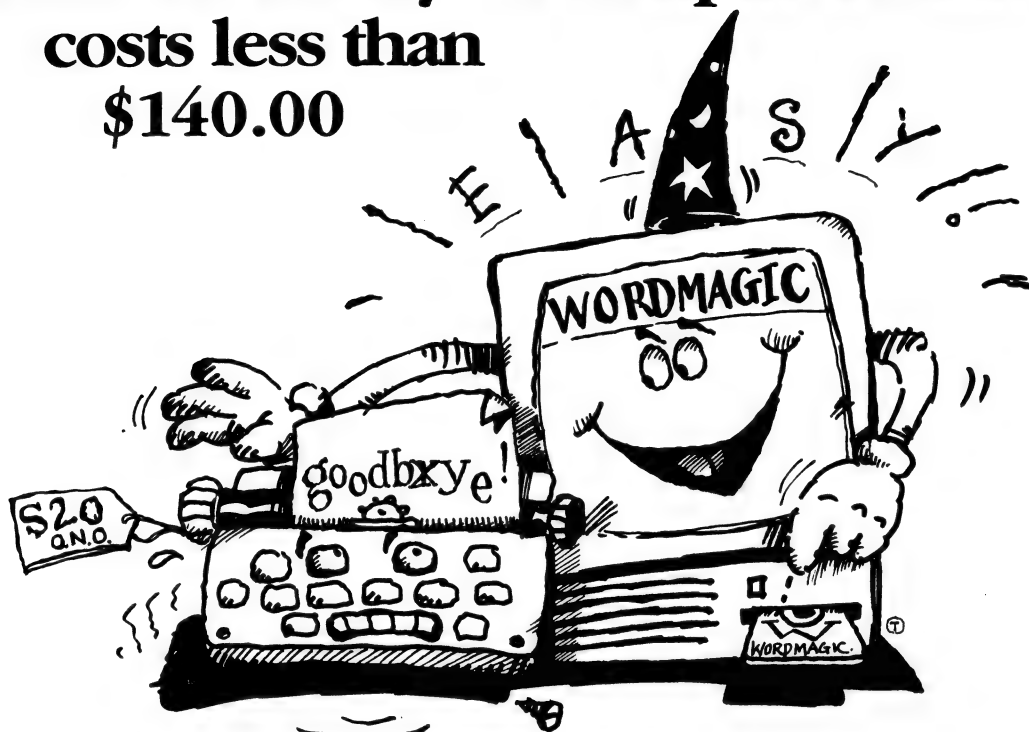
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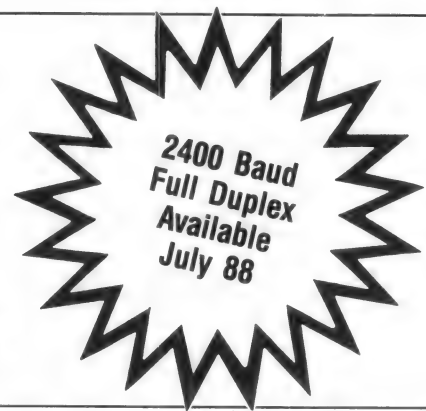
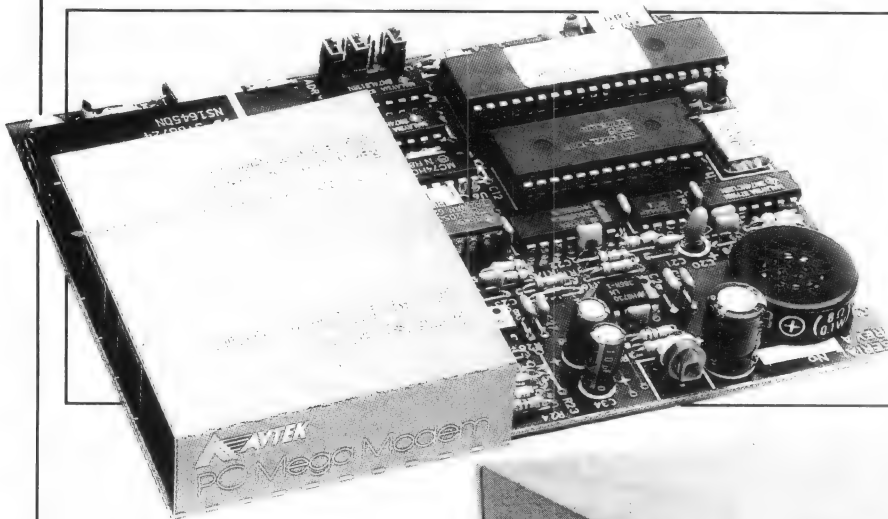
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Part 5

The Attainment of Assembly

This month, John Summerfield gets things sorted out . . .

I HOPE YOU have got Chapter 4's directory-listing program working by now, because it's time to make some minor changes to it. As promised, this month we will get things sorted out. We have an extension to last month's program: after this addition, the directory listing printed by the program will be sorted. After that, we will have a look at some of the support programs that come in the Microsoft assembler package. So far, to assemble programs, and to link them together, it was a matter of 'enter these commands,' or 'use a .BAT file like this one.'

Listing 1 shows lines from the program EX004 which need to be changed to produce EX005: if you left them out when you were entering it you will need to refer to the previous issue to see where they go. The changes are to remove the semicolons which made comments of the statements required to call the sort subroutine. With these changes, the program will call an external subroutine to sort the directory listing.

I will not go into a detailed description of the various sort algorithms: this is, after all, an assembly-language series, not a course on techniques and algorithms. Don Knuth, in the *Art of Computer Programming*, devotes a large volume to sorting and searching!

Sorting Records

I have chosen to use a bubble sort, because it's easy to program, and sufficiently quick for our purposes. The basic algorithm is this —

1. Clear swapped-records flag;
2. Set pointers to first and second records;
3. Compare selected records' keys; if the second is less than the first: *a*) swap records, and *b*) set swapped-records flag;
4. Increase both pointers by one record position;
5. If both pointers point to valid records, go to step 3;
6. If the swapped-records flag is true, go to step 1.

For an example, take records with keys Z, A, B, C. On the first pass, we compare Z with A. Since A is less than Z, we execute steps 3a and 3b. At step 4, the pointers are updated to point to Z (the new record 2), and B. Since both pointers point to valid records, we go back to step 3.

Following these instructions, the Z record bubbles, or ripples, along to the end of the table. Similarly, each of the records it passes advances one position toward the front of the table.

Finally, one of the pointers is advanced to point beyond the table, and we fall through to step 6. Since we execute step 3b at least once, the flag indicating that record positions were exchanged at least once, we need to make another pass; if we don't, the table might not be sorted. However, we can be absolutely certain that one record is in position: whichever record is now in the last position in the table. Therefore, we reduce the table size by

one record, and make another pass.

This sort algorithm is sensitive to the order of the data: if the records are already sorted, it makes one pass of the data, finds there were no record exchanges, and ends. However, if the records are in reverse order, its performance is terrible. I have never needed to sort a large-enough number of records often enough to make it worth using a more complicated sort algorithm.

This sort subroutine is one which I wrote some years ago for use from PL/I-86. It was written to be assembled with RASM-86, an assembler which does not implement macros, structs and the like (it does implement a special macro called codemacros).

Sort routine parameters

To sort a table, it's necessary to know *a*) where the table starts; *b*) where it ends (or how long it is); *c*) the size of individual elements; *d*) the starting position of the key; *e*) the length of the key; and *f*) the type of key (character string, binary number, floating point, decimal, whatever).

If you compare the structure called PRM in Listing 2 with the area Sort?Parameter?Block in Listing 1, you will see some discrepancies. First, the order of the fields is reversed. This happens when SORT copies the parameters onto the stack: it loads words from successively higher addresses, and stores them in successively lower addresses.

Second, there is extra space allowed in the PRM structure: this is because in addition to placing the parameters on the stack, by the time the area is in use, a return address (call from BSORT to SORT) and a register contents (BP) is added to the stack.

Since the entry-point BSORT is intended to be called from PL/I programs, and it is defined in PL/I as having a POINTER parameter, register BX contains the offset address of a word which contains the offset address of the structure.

If you're confused, just code it as shown, and try to work through the instructions from the point where it's called until the parameters have been located. It may help further to trace through the instructions with DEBUG.

Procedure BSORT

The first two instructions navigate the chain of pointers. Since I thought I might also want to use it from Pascal or C, the next few instructions copy the parameters onto the stack. Thereafter, register BP is used to address the various parameters as required.

While I haven't tested it (I don't have MS Pascal), my reading of Microsoft's manual *Microsoft Macro Assembler 5.0 Mixed-Language Programming Guide* indicates that the entry-point SORT can be called from MS Pascal, perhaps with some minor changes. It will certainly require some changes for MS C.

Procedure SORT

This procedure controls the sorting process. The first four instructions are those recommended by Microsoft for interfacing with high-level languages. If you wish to interface with any high-level language, it is essential to read the documentation closely.

For clarification, examine the object code produced by the compiler to achieve the interface. It's up to the compiler-writer to determine the interface between subroutines, and it is highly probable that different languages, even from the same vendor will have different approaches. The same compiler is likely to do it differently given different compiler switches (for example, to select different memory models).

Having followed the correct protocol, the length of the items in the table is loaded into register BX. Register BX is used because it's faster than RAM, and because it can be used in address computations: registers AX, CX and DX can't be, while the others that can be used in address arithmetic (BP, SI, DI) all have other duties.

The instructions labelled 'SRT10' correspond with steps 1 and 2 in our sort algorithm. Register DX is used as the flag; SI is set to point to the start of the table. The instructions 'SRT20' through 'SRT70' correspond to steps 3a and 3b. It's complicated a little by using two different comparison methods: the instructions following 'SRT20' are case sensitive, those following SRT30 convert to uppercase before comparing.

To implement other bases for comparison, you can add more instructions for the various methods you want (fixed-point binary, floating-point, and so on) in this area.

The instructions following 'SRT70' and preceding 'SRT80' implement steps 4 and 5 of the algorithm. Following 'SRT80', it's only necessary to test whether any records were swapped: if any were, to program branches to 'SRT10' to make another pass over the data.

Finally, it remains to restore registers according to the prevailing protocol, and return to the caller. In this case, the return instruction is 'RET 12.' This is appropriate for MS Pascal but not for MS C. The effect of the return instruction is to return to the caller AND remove the parameters that were placed on the stack in the loop beginning 'BS10'.

The SWAP Procedure

Anybody who's coded a sort routine knows that they can consume large amounts of CPU time! When I wrote this routine, I had several different versions, and I conducted a series of timing tests. It's obvious, isn't it, that it is very important to have an efficient algorithm for comparing record keys. Quite clearly, the instructions will be executed $n-1$ times to compare n records.

Well, I found an even more critical part, at least on the data I use. I fiddled and fiddled with the compare instructions, and found they didn't have all that much effect! I figure that's so because in most cases, the record keys differ in the first few characters, say, 1-3 bytes.

When it's necessary to swap records, it is necessary to process every last byte. In the directory listing, our record keys are the file names: they are 11 bytes long. If you examine your file names, you will probably find that the names vary after only a very few characters.

The swap algorithm I have used is quite short (although it can probably be sped up quite a deal by using an intermediate work area) and straightforward. It uses the XCHG instructions to swap data between locations, and 16-bit registers for intermediate storage. To reduce the time taken, the length in bytes is changed to the equivalent number of words. If there's an odd byte, it is picked up outside the loop.

Listing 1. These lines need to be changed in Listing 1, Part 4, to remove the semicolons which made comments of the statements required to call the sort subroutine.

```

117 80E3 80E5 R      Sort_Parameter_Block_Pointer dw      spbp      i<==
118 80E5 80E7 R      spbp dw      Sort_Parameter_Block      i<==
119 80E7          Sort_Parameter_Block label word      i<==
120 80E7 000C          dw      12      ;key length      i<==
121 80E7 000A          dw      10      ;offset to key      i<==
122 80E7 0020          dw      32      ;entry length      i<==
123 80ED 0000          Sort_Buffer dw      0      i<==
124 80EF 0000          Sort_Buffer_End dw      0      i<==
125 80F1 0000          dw      0      ;key type      i<==
165
190 0024 BE 0000 R      extrn bsort:near
      mov      si,offset SourceFiles      i<==
      i<==
250 0092          SortDirectory proc      near      i<==
251 0092 8B 80E3 R      mov      bx,offset Sort_Parameter_Block_pointer      i<==
252 0095 89 36 80ED R      mov      Word Ptr Sort_Buffer,si      ;address of area      i<==
253 0099 89 3E 80EF R      mov      Sort_Buffer_End,di      ;address end of area      i<==
254 0090 EB 0000 E      call      bsort      ;sort it      i<==
255 00A0 C3          ret      i<==
256 00A1          SortDirectory endp      i<==

```

Listing 2. After the addition of these lines to Listing 1, Part 4, the directory listing printed by the program will be sorted.

```

0000          _code      public      segment byte 'code'
      public      bsort:sort
      assume      cs:_code

0000 0004[      prm      struc
      db      4 dup(?)
      ]

0004 ?? ??      prmKeyT      db      ??,?
0006 ????      prmrecl      dw      ?
0008 ????      prmrecl      dw      ?
000A ????      prmrlen      dw      ?
000C ????      prmkey      dw      ?
000E ????      prmkeyl      dw      ?
0010          prm      ends
0000          bsort
0000 8B 37          proc      near
      mov      si,[bx]      ;address the sort
                                parameter block address
0002 8B 34          mov      si,[si]
0004 89 0006      mov      cx,6
0007 A0          lodsb
0008 50          push      ax
0009 E2 FC      loop      bs10:
000B EB 000F R      call      sort
000E C3          ret
000F          bsort      endp
000F          Sort proc      near
000F 55          push      bp
0010 8B EC      mov      bp,sp
0012 56          push      si
0014 57          push      di
0016 8B 5E 0A      mov      bx,[bp].prmrlen      ;length of each entry
0017 8B 76 0B      mov      si,[bp].prmrecl      ;address of start
001A 33 02          xor      dx,dx
001C 8B 4E 0E      mov      cx,[bp].prmkeyl      ;key length
001F 56          push      si
0020 03 76 0C      add      si,[bp].prmkey      ;address of key
0023 8D 36      lea      di,[si+bx]
0025 80 7E 04 01      cmp      [bp].prmkeyt,1      ;key type=1:
                                ignore different cases
0029 74 06          je      srt30
002B F3/ A6      repe      cmpsb      ;compare the string
002D 76 14      jna      srt70      ;low: do not swap
002F EB 0C          jmp short srt60

0031 8A 20          srt30:      mov      ah,0[si]+[bx]
0033 AC          lodsb
0034 25 0F0F      and      ax,not ' '
0037 3A C4          cmp      al,ah
0039 E1 F6      loope      srt30
003B 76 06      jna      srt70

003D          srt60:
003D 5E          pop      si
003E 56          push      si
003F E8 0057 R      call      swap
0042 42          inc      dx
0043          srt70:      ;either swapped records,
                                or compared two without swap
0043 5E          pop      si
0044 03 F3      add      si,bx      ;point to the next one
0046 8D 0B      lea      cx,[si+bx]
0048 3B 4E 06      cmp      cx,[bp].prmrecl      ;... end of list?
004B 72 CF      jb      srt20      ;a... no
                                ; a pass through the records has just been completed
004D 0B 02      or      dx,dx      ;... any swaps made?
004F 75 C6      jnz      srt10      ;a... yes, make another pass

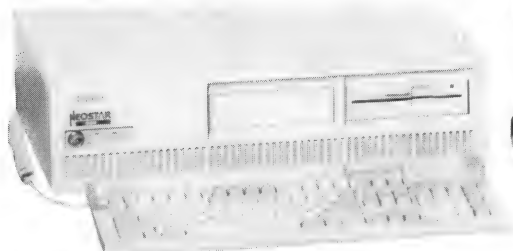
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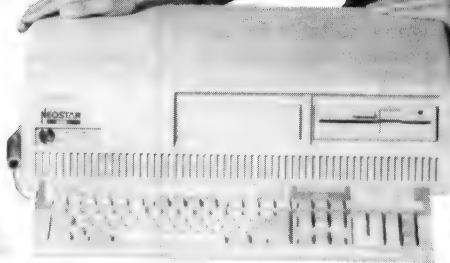
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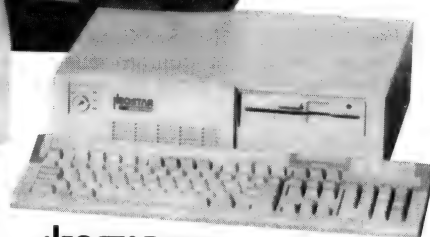


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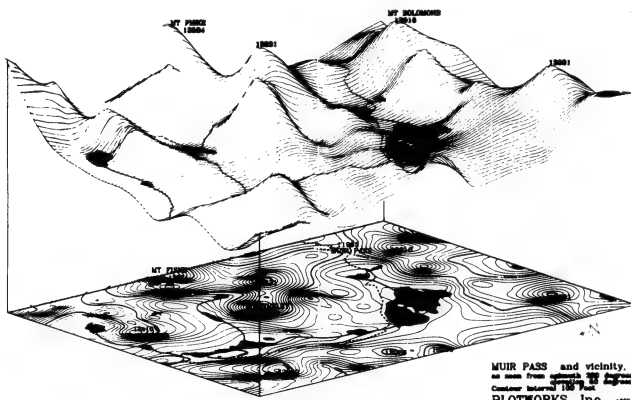
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INSTRUCTION SET ASSEMBLY LANGUAGE

```
0051 SF      srt90:      pop    di
0052 SE      pop        si
0053 SO      pop        bp
0054 C2 000C      ret     12      ;return to caller,
                                pop the parameters
                                off the stack

0057          sort endp
0057          swap proc
0057 8B CB      mov     cx,ebx      ;length of a record
0057 8B FE      mov     di,si
0059 8B FE      mov     cx,1      ;convert bytes to words
0058 01 E9      shr     cx,1      ;load a word here
0050 8B 05      mov     ax,[di]    ;swap a word there
005F 87 01      xchg    ax,[di+bx]
0061 A8        stosw      ;store word, update pointer
0062 E2 F9      loop    sw10      ;go and get the next one
0064 73 05      jnc     sw20      ;jump if there
                                was an even number of bytes

0066 BA 05      mov     al,[di]    ;finally,
                                exchange the last byte

0068 86 01      xchg    al,[di+bx]
006A AA        stosb
0068 C3        sw20:      ret
006C          swap endp
006C          _code      ends
006C          end
```

Structures and Records:

Name	Width	# fields	Mask	Initial
	Shift	Width		
PRM	0010	0007		
PRMKEYT	0004			
PRMRECE	0006			
PRMREC1	0008			
PRMLEN	000A			
PRMKEY	000C			
PRMKEYL	000E			

Segments and Groups:

Name	Length	Align	Combine	Class
_CODE	006C	BYTE	NONE	'CODE'

Symbols:

Name	Type	Value	Attr
BS10	L NEAR	0007	_CODE
BSORT	N PROC	0000	_CODE
SORT	N PROC	000F	_CODE
SRT10	L NEAR	0017	_CODE
SRT20	L NEAR	001C	_CODE
SRT30	L NEAR	0031	_CODE
SRT60	L NEAR	0030	_CODE
SRT70	L NEAR	0043	_CODE
SRT90	L NEAR	0051	_CODE
SW10	L NEAR	0050	_CODE
SW20	L NEAR	0068	_CODE
SWAP	N PROC	0057	_CODE
afILENAME	TEXT	sort	

87 Source Lines
87 Total Lines
27 Symbols

50342 + 182266 Bytes symbol space 'free'

0 Warning Errors
0 Severe Errors

If you want to try to speed it up, you can either have a local work area (which will set the maximum size record you can process), or add it to the parameters passed. If you require the caller to have a vacant position at the end of the table, you will probably get what you deserve; sooner or later, someone (you) will probably forget to leave the space with one or more of the nasty consequences I mentioned in Part 1.

That's the end of this month's programming exercise. In Part 6 we will add a few refinements: command-line switches to select different positions (and lengths) for the sort key which will allow the listing to be sorted by file type, date, file-size. Come to think of it, I might have to change the sort routine to cope with fixed-point binary numbers □

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The new instructions

First, an apology for missing out on explaining instructions when they were first used. I was examining my manually-maintained list of instructions and said to myself 'Surely I've used that! And that!' ... and so I have. So, some explanations –

XOR – I used the XOR instruction in Part 2.

```
XOR reg8mem8,reg8num8
XOR reg8,reg8mem8num8
XOR reg16mem16,reg16num16
XOR reg16,reg16mem16num16
```

These instructions perform a logical exclusive OR of the two operands. The result replaces first operand's contents.

The zero flag is set true if the entire result is zero: otherwise it is zero. This instruction can be used to clear a register (XOR AH,AH clears register AH). It is also useful for implementing a binary switch: to perform some action every second time an event occurs.

For example, let's suppose you are writing a print program which uses some control characters to implement print various printing enhancements. You could use, say, Ctrl-B to switch bold-print on the first time it's encountered, turn it off the second time, and so on. The following instruction sequence could be useful –

```
XOR B_Flag,1
JZ Bold_Off
; Bold on processing
JMP SHORT Next_Char
Bold_Off:
; Bold off processing
Next_Char:
```

```
B_Flag db 0;the initial value determines whether bold is
initially ON or OFF.
```

Note that in this case, you can't use the other bits in the byte for other flags: I did once, and came badly unstuck. The first time the XOR instruction is executed, B_Flag becomes 1, the second time 0, and so on.

ADC – I used the ADC instruction in Part 4. This instruction takes all the forms of the ADD instruction. It adds three numbers: the two operands as in the ADD instruction, plus the carry flag. After instructions the register AX contains 1 –

```
XOR AX,AX ;clear register AX
STC ;set the carry flag
ADC AX,AX ;add ax,ax plus the carry flag.
```

This instruction is useful in implementing multiple-precision addition, such as in these instructions to add ten to a 32-bit counter –

```
ADD AX,10
ADC DX,0
```

LOOPE, LOOPNE – I used the LOOP and LOOPE instructions in Part 4. These instructions are used to control looping. The LOOP instruction subtracts 1 from register CX. If the result is non-zero, a branch is made to the target address.

The LOOPE and LOOPNE function in the same way as the LOOP instruction, but also test the ZERO flag before deciding whether to jump: the LOOPE only branches if the ZERO flag is true, LOOPNE only if it is false. For example, the following in-

structions can be used to process a nul-terminated string which may be up to 10 bytes long –

```
MOV CX,10 ;maximum string size
MOV SI,String_Start ;start address
LP: LOOSB ;load first/next byte
PUSH AX ;save it
CALL ProcessString ;process it
POP AX ;get it back
OR AL,AL ;zero zero flag if it's nul
LOOPE LP ;process next
```

It compares the byte pointed with registers DS:SI with the one pointed to by ES:DI. Registers SI and DI are incremented. If the bytes are equal, the ZERO flag is set: otherwise it is cleared. This instruction is generally used with the REPE prefix to compare two strings *of bytes*. In this case, the comparison continues until the ZERO flag becomes false or register CX becomes zero. It compares the word pointed with registers DS:SI with the one pointed to by ES:DI. Registers SI and DI are incremented. If the words are equal, the ZERO flag is set: otherwise it is cleared.

This instruction is generally used with the REPE prefix to compare two strings *of words*. In this case, the comparison continues until the ZERO flag becomes false or register CX becomes zero.

While it's technically feasible to use CMPSW to compare strings of bytes, thus gaining a significant speed improvement, in the same way we can use MOVSW to move bytes, there is some fiddly work to do when the strings compare not equal: it is necessary to back up a little and then compare bytes to find the point of difference. It's necessary to find the point of difference to determine which should appear first in a sorted list. Let's look at an example –

```
DB '12'
```

If the 8086 compares these two data items, it agrees with us that the first is less than the second. However, if they are processed as words, the second by is considered more significant than the first. Therefore, the '2' from the first will be compared with the '1' from the second. The first will be considered greater than the second, opposite from the other comparison.

JNA, JBE – These are the same instruction; the mnemonics stand for Jump Not Above and Jump Below or Equal. If both the zero flag and the carry flag are false, the jump is not taken. If either or both are true, the jump is taken. This instruction is used to test the result of an unsigned comparison (as in comparing characters) rather than a comparison of signed integers.

reg16,num16|mem16 – This instruction is used to calculate an address. Unlike the MOV instruction, this loads the address of mem16 into register reg16, not its contents. The components of the address may include an offset (0-65535), a pointer register (bx or bp) and an index register (si, di).

REP, REPNE – These instruction prefix are like REP which we covered in Part 3. However, they also test the ZERO flag. REP terminates when CX becomes zero, or when the ZERO flag becomes false. Conversely, REPNE terminates when CX becomes zero or then the ZERO flag becomes true.

When used with CMPSB, they are useful for comparing strings of bytes. Since the CMPSB instruction increments SI and DI after the comparison whether they compare equal or not, they point to the byte AFTER the last byte compared.

THE PROPHET

Computers are fun! No matter how much you know about them (or think you do) there is always another surprise in store for you. After losing all of Prophet on at least three occasions in the last couple of months, backups are being done more often (now if anyone asks me why I haven't got time to chat on the system I will scream).

I was backing up the main drive just now, the one that has all the user files, messages and other important stuff on it; you know what happens? The thing backs up to the first floppy, gets to the end of the disk, and comes up with a seek error. Nonchalant as ever, I think that it was just a bad floppy, put in a new one – and it happens again. Now I start to get worried – is the hard disk the problem? So, I scanned the disk and not a problem in sight.

Now I am really getting worried, try again, NBG (No Bleedin Good) it just died again. Right, open up the machine, check that all the plugs, sockets, screws and sticky tape are still in place – no worries. Close it all up, try again, groan, moan, yep it failed. Despair strikes, what am I going to do? I have a bit of a walk, come back and try again, still fails.

Because I am a sticky beak I decide to watch the floppy write the data to the disk, open up the case again, prop it open, start again. Away it goes, no problems, no errors, what the hell! The backup ticks away and I am going around in circles, what is this silly machine doing trying to send me to an early meeting with the big computer manufacturer in the sky or just getting even for when I swear at it when it deletes files I told it to (but didn't really want deleted)?

*Right, open up the
machine, check that all
the plugs, sockets,
screws and sticky tape
are still in place – no
worries. Close it all up,
try again, groan, moan,
yep it failed.*

In a daze, I watch the floppy head sliding gracefully along the disk on about disk number 35 and I marvel at how the disk head joyfully misses the control cable just a couple of millimetres above it. Aar-gghh! – yes, above it now, but when the lid is shut, guess what? Sure, that pesky cable would be even closer, and when it touches, maybe nothing, but when it catches the drive head. Jam, no go, failure, as Number 5 would say 'Piece of Cake!' Just goes to show, computers do plot against you.

Speaking of plotting, here I am testing away one of my marvels of programming and getting rubbish answers from the pro-

gram. Check the code, it is fine; check the parameters to the function being used and they are spot on too! Check the output... rubbish.

This pesky little bit of code (I will be honest, it is a whole one line) just refuses to do what I tell it too. No matter what I do it will not work. I split the line into four separate steps, each of the intermediate calculations are perfect, the output is rubbish.

After a number of hours and much tearing of hair I go to the assemble code generated by the compiler (those of you who know me would realise what state I must be in to go to the assembler level to debug). Lo and behold (using Codeview naturally) I look at the source line and then look at the assembler it generated – the silly thing generated the wrong code!

Just so you know I am not suffering from delusions of grandeur, I was using a function called sprintf() which takes a format string and arguments and loads the information into a buffer. Now I was passing this thing an integer and a long, but for some unknown reason the compiler was treating the integer as a long as well and stuffing (no I am not swearing) 4 bytes onto the stack instead of 2. Change the thing to do it in two separate calls and it works!

For those people who have asked for the Prolib library, I am sorry but the documentation is not finished. I am waiting for a text formatter that will allow me to have the pipe character on the right hand margin for all the changes I make. Because I want this feature before allowing the library into the real world, all has stopped. I will announce the library again when it is actually available for downloading. □

Primary electronic collection points

The last full listing was given in the April 1988 issue; refer to the Services page on how to obtain Back issues.

ACT – PC Exchange RIBM
(062) 58 1406

NSW – Prophet TBBS
(02) 628 5222

Vic. – The National
(03) 25 6904

Qld. – AMPAK RCP/M
(07) 263 7070

SA – The Electronic Oracle
(08) 260 6222

WA – Nemo Multiple BBS RAPL
(09) 370 1855

PAMS News 8804

NEW SOUTH WALES

*** NEW System ***

Airlock Hermitage
Sysop: Greg Glynn
Phone: (02) 600-1384
FIDOnet: 713/609
Baud: V21 V22 V22bis V23
Access: Reg VA
Hours: Weekdays: 1700 – 0830
Weekends: 24 hours
Computer: IBM PS/2 60
DOS: PC DOS

BBSSoftware: Opus

*** Amended ***

Alpha Juno BBS
Sysop: Kevin Withnall & John L. Rich
Phone: (02) 774-4709
FIDOnet: 620/701
Baud: V22 V22bis
Access: Public
Computer: Olivett M24
DOS: MS DOS
BBSSoftware: Opus
*** Name Changed ***

Arco-Tel BBS
Info: Now Called
 Compax Computers BBS
 *** Amended ***
 Arknet
Sysop: Andrew Khoo
Phone: (02) 868-4836
FIDOnet: 711/805
Baud: V22 V22bis B103
Access: Reg
Computer: IBM AT
DOS: Xenix
Info: Logon as guest and mail user for access
 *** Amended ***
 Beauford BBS
Sysop: Roger Cooper
Phone: (047) 58-6542
Baud: V21 V22 V23
Access: Public
Computer: IBM XT Clone
BBSSoftware: Fido
 *** NEW System ***
 Bill's BBS
Sysop: Bill Mastro
Phone: (049) 62-2044
Baud: V21 V22 V23
Access: Reg
Computer: Apple IIE Clone
DOS: PRO DOS
BBSSoftware: GBBS PRO
 *** Amended ***
 Cesspit
Sysop: Moby Disk
Phone: (02) 543-7204
Baud: V21 V22 V23 B103 B212
Computer: Apple IIE
DOS: PRO DOS
BBSSoftware: GBBS PRO
 *** Online ***
 CoCo Arena
Sysop: John Kelly
Phone: (02) 646-5573
 *** Amended ***
 CoCo Connection
Sysop: Barry Darnton
Phone: (02) 618-3591
Baud: V21 V22 V22bis V23
Access: Reg
Computer: IBM PC
DOS: MS DOS
BBSSoftware: BBS-PC!
 *** Amended ***
 Commodore C-64 BBS
Sysop: Graham Lee
Phone: (02) 664-2334
Baud: V21 V22 V23
Access: Mem VA
Computer: C64
BBSSoftware: Punter
 *** Amended ***
 Compax Computers BBS
Sysop: Alex Sardo
Phone: (02) 683-3956
FIDOnet: 713/601
Baud: V21 V22 V22bis V23
Access: Mem
Computer: XT Clone
DOS: DOS

BBSSoftware: Opus
 *** Amended ***
 Cursor Contact KBBS
Sysop: Infiltrator
Phone: (02) 637-8131
Baud: V21
Access: Reg LVA
Computer: C-64
DOS: Commodore Basic
BBSSoftware: miniBOARD
 *** Offline ***
 Dingo's Den BBS
 *** Offline ***
 EasyComm Opus
 *** Offline ***
 Freeze World
 *** Offline ***
 Galactic Federation
 *** Unknown ***
 Galaxy RAPL
 *** Offline ***
 GCS
 *** Amended ***
 Illawarra C-64 BBS
Sysop: John Simon
Phone: (042) 61-8230
Baud: V21
Access: Reg VA
Computer: C64
BBSSoftware: KBBS
 *** NEW System ***
 Integra TEX
Sysop: Kevin Leong
Phone: (02) 746-1109
FIDOnet: 712/703
Baud: V21 V22 V23
Access: Public
Computer: IBM AT Clone
DOS: PC DOS
BBSSoftware: Opus
 *** Offline ***
 Matrix (Maitland) BBS
 *** NEW System ***
 MicroBASE BBS
Sysop: Dave Whiteman
Phone: (047) 35-1358
FIDOnet: 713/305
Baud: V21 V22 V22bis V23
Access: Mem VA
Hours: Daily: 2200 – 0600
Computer: IBM XT Clone
DOS: MS DOS
BBSSoftware: QuickBBS
 *** Offline ***
 Midnight Quest
 *** Amended ***
 Milliway's
Sysop: David Coucke
Phone: (02) 357-7027
Baud: V21 V22
Access: Reg VA
Computer: Amiga 1000
BBSSoftware: BBS-PC!
 *** Amended ***
 Nebula RAPL
Sysop: Sean Craig
Phone: (02) 407-2729

Baud: V21 V22 V22bis V23
Access: Mem VA
Computer: Apple IIgs
 *** Amended ***
 Newcastle Micro Club RCPM
Sysop: Tony Nicholson
Phone: (049) 68-5289
Baud: V21 V22 V23
Access: Mem VA
Hours: Weekdays: 1700 – 0830
Weekends: 24 Hours
Computer: Ferguson Big Board
DOS: CP/M80+
BBSSoftware: ROS
 *cf96,8,8.5 *** Unknown ***
 Sci-Fi BBS
 *** Amended ***
 Sentry
Sysop: Trev Roydhouse
Phone: (02) 428-4687
FIDOnet: 711/401
Baud: V21 V22 V22bis V23
Access: Mem VA
Computer: IBM AT Clone
BBSSoftware: Opus
 *** NEW System ***
 Silent Running
Sysop: Frank Sinatra
Phone: (02) 690-1940
Baud: V21 V22 V22bis V23
Access: Reg
Computer: Apple
DOS: PRO DOS
BBSSoftware: Prime
 *** Amended ***
 Steel City
Sysop: Craig Sinclair
Phone: (042) 83-7247
FIDOnet: 712/420
Baud: V21 V22 V22bis V23
Access: Reg LVA
Hours: Daily: 1830 – 0630
Computer: XT Clone
DOS: MS DOS
BBSSoftware: Opus
 *** Offline ***
 The Guild FRP BBS
 *** Amended ***
 The Lost Tavern
Sysop: Sean Murphy
Phone: (02) 938-6836
FIDOnet: 711/902
Baud: V21 V22 V22bis V23
 *** Unknown ***
 VIP BBS
 *** Amended ***
 Yet Another Bulletin Board
Sysop: Jonathan Chin
Phone: (02) 804-6837
FIDOnet: 711/803
Baud: V21 V22 V22bis V23 B103 B212
Access: Reg VA
Computer: XT Clone
DOS: MS DOS
BBSSoftware: TBBS
NEW ZEALAND
 *** NEW System ***

Poly Vox ///
Sysop: Darrin Gordon
Phone: (03) 79-1917
Baud: V21 V22 V22bis
Access: Reg
Hours: Weekdays: 2100 – 0700
Sat 1300 – Mon 0700
Computer: IBM PC Clone
DOS: MS DOS
BBSSoftware: Opus
 *** NEW System ***
 QuantumNET
Sysop: Jeff Whiteside
Phone: (064) 36-9602
Baud: V21 V22
Access: Mem
Computer: IBM AT Clone
BBSSoftware: BBS-PC!

QUEENSLAND

*** NEW System ***
 Apple-Q Node 2
Sysop: Kelvin Saggars
Phone: (07) 800-4660
Baud: V21 V22 V22bis V23
Access: Mem
Hours: Weekdays: 2130 – 0530
 *** Amended ***
 Commodore Computer Users Group
Sysop: Greg Shea
Phone: (07) 344-1833
Baud: V21 V22 V22bis V23 B103 B212
BBSSoftware: Punter
 *** NEW System ***
 Cyberpunk City
Sysop: Greg Mc Cormick
Phone: (07) 355-0760
FIDOnet: 640/303
Baud: V21 V22 V23 B103 B212
 *** Amended ***
 Electric Dreams BBS
Sysop: Joe Altoff
Phone: (07) 399-1322
Baud: V21 V22 V23
Access: Mem VA
Info: User Works Node #≤ ÷
 *** NEW System ***
 NQ Connection
Sysop: Geoff Gordon
Phone: (077) 79-7660
FIDOnet: 640/710
Baud: V21 V22 V22bis V23
Access: Public
Computer: Kaypro XT
BBSSoftware: Fido

SOUTH AUSTRALIA

*** Offline ***
 Cadzow Fido
 *** NEW System ***
 Phone Box BBS
Sysop: Darryl Merritt
Phone: (08) 380-5505
FIDOnet: 680/813
Baud: V21 V22 V23
Access: Public
Computer: Mitec
DOS: MS DOS
BBSSoftware: Opus



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AIM

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Phone: (03) 592-3338

Baud: V21 V22 V22bis

Access: Reg VA

Computer: IBM Clone

BBSSoftware: Opus

*** Amended ***

Anzugs CBCS

Sysop: Gordon Castle

Phone: (03) 563-2496

FIDOnet: 631/329

Baud: V22 V22bis B212

Access: Mem Public

Computer: IBM Model 80

DOS: PC DOS

BBSSoftware: Opus

*** Amended ***

Big Tedd's Bulletin Board

Sysop: Rob Bates

Phone: (03) 509-6067

FIDOnet: 630/308

Baud: V21 V22 V23

Access: Reg LVA

Computer: IBM XT Clone

BBSSoftware: Opus

*** Amended ***

Brainstorm Australia

Sysop: Rowan Stevens

Phone: (03) 758-7086

FIDOnet: 631/322

Baud: V21 V22 V22bis V23 B103 B212

Computer: IBM XT

BBSSoftware: Opus

*** Amended ***

Cave 76

Sysop: Avatar

Phone: (03) 882-9197

Baud: V21 V22 V22bis V23

Hours: 1800 - 1000 Daily

Computer: XT Clone

*** NEW System ***

Delta BBS

Sysop: Big Mother

Phone: (03) 793-4548

Baud: V21 V22 V22bis V23

Access: Reg

Computer: Apple IIE

BBSSoftware: GBBS PRO

*** Amended ***

Down Under Amiga/IBM

Sysop: Greg Hudson

Phone: (03) 429-5819

FIDOnet: 630/306

Baud: V22 V22bis V23

Access: Public

Computer: Compaq 386

DOS: PC DOS

BBSSoftware: Opus

*** Amended ***

East Suburb Eighty User Group

Sysop: Martin Axford

Phone: (03) 819-5179

FIDOnet: 632/347

Baud: V21 V22 V23 V23ORG

*** Amended ***

Eastwood Opus

Sysop: Mick Stock

Phone: (03) 870-4623

FIDOnet: 632/343

Baud: V22 V23

Access: Reg VA

BBSSoftware: Opus

*** NEW System ***

Labyrinth

Sysop: Amphion Kyrell

Phone: (03) 318-6562

Baud: V21

Access: Reg VA

Hours: Daily: 2100 - 0900

Computer: IBM XT Clone

DOS: MS DOS

BBSSoftware: Fido

*** Amended ***

Melbourne Data Exchange

Sysop: Robert Broomhead

Phone: (03) 561-6556

FIDOnet: 633/360

Baud: V21 V22 V22bis V23

Access: Reg VA

BBSSoftware: Opus

*** Amended ***

Museum BBS

Sysop: Rupert Russell

Phone: (03) 662-3336

FIDOnet: 633/363

Baud: V21 V22 V23 B103 B212

Access: Public

Computer: IBM XT Clone

DOS: MS DOS

BBSSoftware: Opus

Info: Information on the Museum of

Victoria

*** Amended ***

Outer Limits BBS

Sysop: Peter Dorell

Phone: (03) 725-2895

Baud: V21 V22 V23

*** Unknown ***

VIDEOTEXT/4000

*** Amended ***

Zoist

Sysop: Bob Fletcher

Phone: (03) 467-2871

Baud: V21 V22 V22bis V23

Access: Mem VA

WESTERN

AUSTRALIA

*** Amended ***

Amiga Mouse BBS

Sysop: Martyn Bate

Phone: (09) 310-2457

Baud: V21 V22 V22bis V23 B103

B212

Access: Reg LVA

Computer: Amiga 1000

DOS: Amiga DOS

BBSSoftware: BBS-PC!

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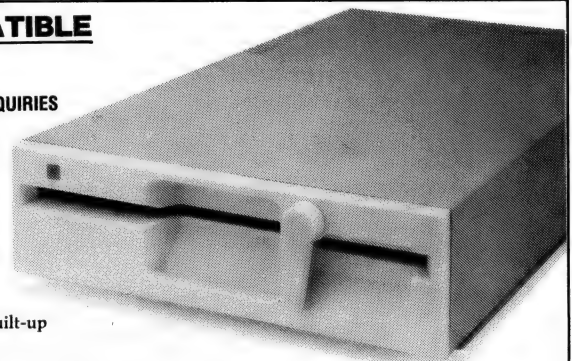
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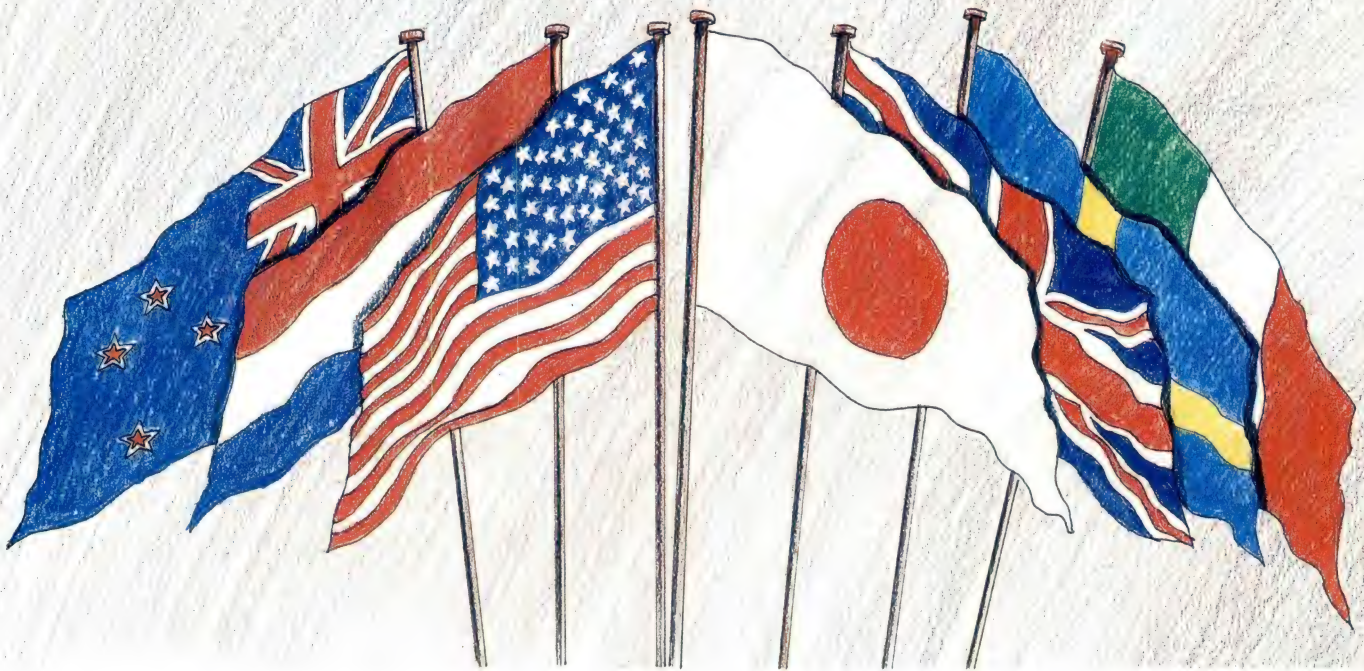
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3. Prizes are not transferable or exchangeable and may not be converted to cash.
4. The judges decision is final and no correspondence will be entered in to.
5. Description of the competition and instructions on how to enter form a part of the competition conditions.
6. The competition commences on April 1, 1988 and closes with last mail on July 31, 1988. The draw will take place in Sydney on October 12, 1988 and the winner will be notified by telephone and letter. The winner will also be announced in the Australian on October 17, 1988 and a later issue of the magazine.
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Brisbane 4000 Tel: (07) 232 0306 **WA.** St. Martins Tower 44 Georges Tce Perth Tel: (09) 220 3407

NEW PRODUCTS

NEW PRODUCTS

Have you got a new product that *Your Computer* readers should know about? If so, why not write to the New Products Editor, *Your Computer*, PO Box 227, Waterloo 2017 NSW. Remember to include brief details about the product, its taxed price and the name and phone number of your company. Also enclose a glossy black and white photograph, or 35 mm transparency, if available.

Software

AIS Accounting Software Version 4

AIS

Phone: (03) 579 0244

Price: Not supplied

The AIS Accounting Software is a fully integrated multiuser, multi-company package providing financial and management information. The latest version, 4.0, runs on the PS/2 series as well as the latest 286 and 386 machines. Modules available include general ledger/banking system, budgeting and multiuser company setup, accounts receivable, accounts payable, stock control, purchasing order, payroll, manufacturing, asset register and subscription system.

Astrology software

Astrosoft

Phone: (03) 328 3221

Price: \$99

For the starry eyed Capricornian or the volatile Leo, your future can be predicted with two new packages from Astrosoft. Astro Talk is an astrology package for both the IBM PC and Apple Macintosh. It can help you forecast for the coming month, understand changes in your life and give detailed birth interpretations.

Friends and Lovers adds that *amour* of computers to extremes. It compares the relationship between two people and 'reveals new insight into relationships'. Both ideal for the yuppie in your life!

DSE new releases

Dick Smith Electronics

Phone: (02)

Price: See below

Dick Smith Electronics has announced the release of a new range of MS-DOS, VZ 200/300 and Atari favourites. They include the MS-DOS Mean 18 Golf, a golf game (\$69.95), Gunship, an helicopter flight simulator (\$79.95) and Zenji, a puzzle game for the electronically minded (\$29.95).

Books available include the *VZ Technical Manual* (\$14.95), *The Book of VZ 300 Games* (\$19.95) and *Assembly Programming for the VZ 300* (\$24.95).

Hardware available includes the 16 kilobyte memory expander for the VZ 200 (\$89.95). Software for the VZ 200/300 includes Poker, the card game played with a computer (\$9.95), Hangman (\$9.95), Super Snake (\$14.95) and the graphical adventure game, Dracula Castle (\$14.95).

Hardware for the Atari includes a disk drive (\$399), Pro-line joystick (\$24.95) and printer (\$399). Games available include Joust (\$29.95), Star Raiders (\$29.95), Pole Position, the racing car game (\$29.95) and Moon Patrol (\$29.95).

PROCON

CONSTRUCTION SYSTEMS

Probill

Procon Construction Systems

Phone: (02) 949 1086

Price: \$970 taxed

Probill automatically manages bills of quantities or schedules of rates on any type of contract requiring periodic progress payment. The package was designed for the construction industry.

The program handles up to 3000 pay items and allows them to be integrated into sections and groups for summary reporting. Reports produced include Progress Payment Certificates, projections of final contract value and fully detailed escalation calculations. It is for use on IBM PCs and compatibles.



MacScan

Pica

Phone: (03) 370 3566

Price: See below

MacScan allows line art or a photograph to be captured at a high resolution then manipulated. That image can then be placed into a page layout on screen, eliminating the need for screened bromides or half tones.

A full A4 page of artwork can be captured at 300 dots per inch (dpi) in less than 12 seconds. The resolution is adjustable to 75, 150, 200 or 300 dpi. Full 300 dpi editing of a scanned image is available in a Mac Paint-like environment. You can crop, rotate, invert or flip the scanned image. An image can be viewed at 2, 4 or 8 times reduction and edited at 2, 4 or 8 times magnification.

The MacScan Scanner plugs into the SCSI port on the Mac. The Canon IX-12 Sheetfeed Scanner (\$3950) is ideal for optical character recognition, filing and other sheetfeed purposes while the Canon IX-12F Flatbed Scanner allows for direct scanning from books and magazines (\$4900). The 256 Greyscale option is an upgrade for the Canon scanners and produces quality halftones. MacScan interface comes with software, interface and cables.

Microsoft

Microsoft Pageview

Microsoft

Phone: (02) 452 5088

Price: \$99 untaxed

Microsoft has announced a page preview and graphics integration program that works with Microsoft Works to let users preview documents on screen before printing them.

Word users who have Windows 2.0 or Windows/386 will also be able to use Pageview to insert graphics into documents. Page-

view users can choose to preview either a single page at a time or a two page spread. The program also features WYSIWYG capabilities. Changes can be made to the document from within Pageview.

PC-MOS 386 Release 2.1

SPS

Phone: (02) 419 5366

Price: See below

The latest version of PC-MOS 386 is now available through Australian distributor SPS. The new version of this multiuser, multitasking operation system includes support for applications involving multitasking, high resolution EGA/VGA graphics, enhanced NETBIOS compatibility support for the Wyse 99GT, Hercules video support and compatibility with terminate and stay ready applications such as SideKick. It also features multiuser capability with software applications such as dBase III.

The PC-MOS single user version costs \$391, the five user version costs \$1188 and the 25 user version costs \$1384; all prices taxed. It is available on 5 1/4 and 3 1/2 inch disks.



PC/KeyPlus

Infolink

Phone: (02) 959 5705

Price: Not supplied

PC/KeyPlus is a fully integrated microcomputer version of the KeyPlus mainframe data entry system.

It provides operational functions of the mainframe system on IBM and compatible computers. The system allows data to be keyed in and verified on microcomputers using screens and rules that have been downloaded from mainframe KeyPlus. Once entered, data can be transferred back to mainframe KeyPlus online, or to another destination using offline file transfer techniques.

38 Graham St., Auburn NSW 2144
Phone 648-5091



Terminal emulation

Dimension Graphics

Phone: (02) 929 5855

Price: See below

Dimension Graphics has released the 4107 and 4115 Tektronix terminal emulation software packages that support IBM's hi-res graphics card and monitor – the 8514A. There are two different product configurations – TGRAF-07 (Tektronix 4107) and TGRAF-15 (Tektronix 4115) on the 8514A display.

The first configuration is a single screen emulation product, with both text and graphics on the 8514A monitor. The second configuration supports dual screens: the graphics display is on the 8514A screen and alphanumeric is displayed on a VGA monitor.

Take Charge

Logo Computer Centre

Phone: (02) 819 6811

Price: \$226.30 taxed

Take Charge of your messy desk with the latest product from Logo Computer Centre.

Take Charge is an integrated menu system, desktop organiser and set of utility programs. It is a completely integrated suite of programs which needs under 20 kilobytes of memory.

Vaccinate

UNIXbuilt

Phone: (03) 277 3239

Price: \$595

If your computer has caught the dreaded virus currently doing the computing rounds, then a new program from UNIXbuilt may be the aspirin it needs.

Vaccinate (the program) will protect executable computer programs from being infected. Just as we humans are injected with milder, non-lethal form of disease, so too can your computer. Vaccine is a virus itself which infects the executable file to be protected via the Syringe program. Thereafter the file cannot be infected by other virus programs without warning the end user that a malignant infection has occurred.

Included with the package are sample virus programs so that tests can be performed by the end user and a quarantine program called Canary. When files are imported from an unknown source, a user places Canary on a disk with the suspect files. If the Canary dies, then an infectious program is present.

Note that there is still no cure for the common cold.

TNP

NetComm

Phone: (02) 888 5533

Price: \$114 taxed

NetComm has announced a range of software products to support its modems. The NetComm Program (TNP) is available for the Macintosh, the Commodore 64 and 128, and for the Amiga.

Also available is the NetComm Program Version 3. It features a desktop style environment with pull down menus, Videotex support for EGA and VGA, high performance file transfer protocols and high speed modem support.



Xidex disks

Imagineering

Phone: (02) 697 8666

Price: See below

Imagineering, Australian distributors for Xidex products, has announced a new line of 3 1/2 inch, 5 1/4 inch, 8 inch and high capacity disks from Xidex. The disks are certified 100 per cent error free.

The recording performance levels are reportedly 30 per cent higher than industry standard for greater recording accuracy. A tighter hub hole inner diameter avoids interchange problems between drives. The highly stable polyester base material minimises effect of changes in temperature and humidity.

The disks come in packs of 10, double sided; 5 1/4 inch 48TPI (\$49.60), 3 1/2 inch 132TPI (\$71.00) and 8 inch unformatted (\$70.70). All prices taxed.

New Machines



Atari PC

Atari Computers

Phone: (02) 805 0344

Price: See below

Atari has announced an IBM PC compatible computer with builtin EGA. Designed around the Intel 8088 chip, it performs at either 4.77 or 8.0 MHz and has 512 kilobytes of memory, expandable to 640.

The Atari PC has a builtin Centronics parallel port for printers and an RS232 serial port for modems and serial printers. Other graphics modes supported include CGA, IBM monochrome and Hercules. The Atari PC will be sold bundled with an IBM style keyboard, mouse, mouse port and GEM software. It comes in two versions – the PC2 with twin floppy drive (\$1360) and the PC2 HD with a hard disk (\$2160). The PCM PC124 Tri-scan amber monitor which features EGA, CGA, MDA and Hercules compatibility is also available (\$335).

Atari DTP

Atari

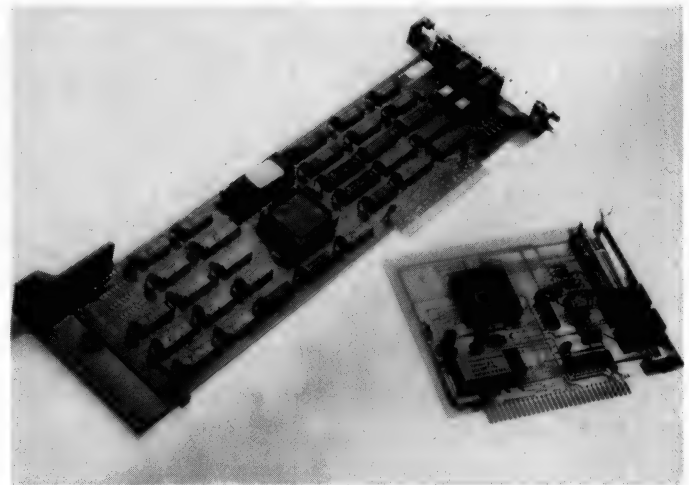
Phone: (02) 805 0344

Price: See below

Atari has announced a desktop publishing (DTP) system. The DTP system includes the new Atari laser printer with the new Mega ST PC. The printer can be software driven. Under software controlled by Mega, the laser printer could conceivably use any page description language and any type font.

The Atari DTP system options are: Mega 2 computer (\$2950), Mega 4 computer (\$3960), SLM804 laser printer (\$3600), SH205 20 Mbyte hard disk (\$1499), Publishing Partner (\$360), mono monitor (\$399) and colour monitor (\$679).

Peripherals and Extensions



MicroBuss/2

Awanet

Phone: (02) 360 2822

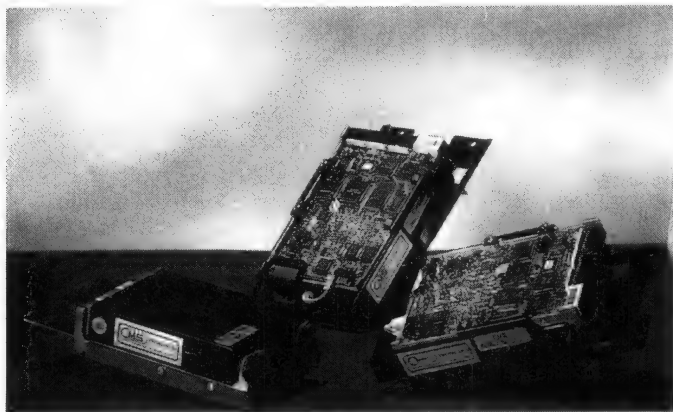
Price: \$895 untaxed

The MicroBuss/2 card enables IBM PS/2 Models 50, 60 and 80 to network together and network to PS/2 Model 30 and any IBM XT, AT, or compatible machines.

The package includes a net-



work adaptor card, software and manual. One board is designed to fit into the PS/2's microchannel bus and the other is designed to fit into standard PCs, PC/XTs, PC/ATs or compatibles. This allows users to enjoy the power of the PS/2 as file server while still being able to use all existing PCs in the same network.



760 printer

Genicom

Phone: (02) 406 6411

Price: \$2090 taxed

Genicom has released the 760 daisy wheel printer, the first of two new daisy wheel additions to its range. The 760 operates at 57 characters per second (cps). The print head is positioned with a belt rather than wire cables, utilising a V shaped print wheel petal which locates into a corresponding indentation on the hammer.

A 1500 character buffer is standard though a 7500 can be supplied. Paper handling and hardware options include three sheet feeders, single, dual and triple bin bidirectional form tractor feed.

A38152-25 Microcache

Austek Microsystems

Phone: (08) 260 0155

Price: \$198

The A38152-25 Microcache is a 25 MHz integrated cache controller for Intel 80386 microprocessor based systems. It enables system designers to incorporate cache memory into their 25 MHz

386 designs, providing a significant increase in system performance.

It features four way set associativity, zero wait state read hits and buffered writes, full 32-bit addressability for 4 gigabyte memory on chip tag RAMs and software cache invalidation.

CPU-100HF

Data Radio Technology

Phone: (03) 873 3777

Price: \$2394

Data Radio Technology, a subsidiary of GFS Electronics, has announced the release of the CPU-100HF smart radio modem. It features Block Exchange Compelled Sequence Protocol proprietary protocol and digital signal processing front end.

It requires only standard modem software in its host computer and is capable of networking up to 128 units. The modem will operate on a combination voice/data channel giving voice priority and has fully transparent and command modes. It also features an RS232 port capable of speeds from 300 to 9600 baud with options for hardware or software handshaking.

CMS drives

Computec

Phone: (03) 882 1326

Price: See below

Melbourne based Computec has announced the availability of a high performance range of CMS drives for the Apple Macintosh, the PRO series. The range includes 100 megabyte internal drives for the SE and up to 300 Mbyte internal drives for the Mac

Maxwell 5

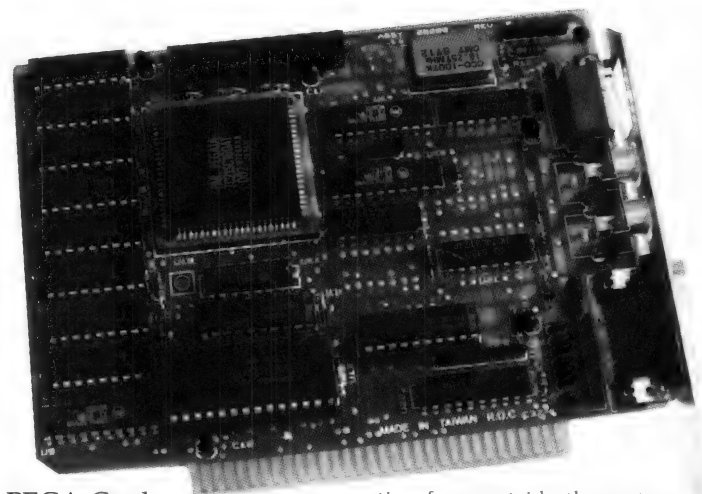
ABE Computers

Phone: (03) 288 2144

Price: \$599

ABE Computers has released the Maxwell 5, a Phonecom combined modem. It operates at full or half duplex at 2400 bits per second with auto fall back. The Maxwell 5 is AT command set compatible and can battery back up ten sets of telephone numbers with 16 digits per set.

It also features auto dial, auto answer and speed select. The data interface is an EIA RS-232. The Maxwell 5 also features test facilities such as powerup self test, and remote digital loop.



PEGA Card

Electronic Solutions

Phone: (02)427 4422

Price: \$295 taxed

Electronic Solutions has announced a price drop for its advanced EGA card, the PEGA Card. Previously selling at \$499 the PEGA is now available for \$295.

The PEGA features complete compatibility with software written for all other video cards, such as Hercules and Plantronics. External switches allow for configu-

ration from outside the system. Flicker free scrolling is performed in all modes. It has 256 kilobytes of RAM installed.

II. For the network user Computec are able to offer expandable pedestal/chassis systems with capacities from 300 Mbyte right up to 1.2 gigabytes.

The PRO100-2 costs \$3078, the PRO140 is \$4134, the PRO150 is \$4883 and the PRO300 costs \$7740. All prices taxed.



Mural Plotter

Barrington Corporation

Phone: (08) 232 1333

Price: See below

Local production has commenced on the Mural Plotter, an AI flat bed Cad plotter which incorporates an electro static paper hold down device. The plotter features an internal 88 kilobyte buffer. It is designed to support all Cad and engineering packages using H-P-GL plotter languages. There are three sizes available: A1 (\$4600), A2 (\$3300) and A0 (\$6800). All prices taxed.

Felix

President

Phone: (02) 476 2700

Price: \$250

President Computers has announced that it will be building under licence an Optical Pointing Device, which the company claims will replace the mouse.

ALL NEW

DOSMATE

DOSMATE — The \$95 program that's almost a DOS manual on a disk!

Just about every complex computer program on the market today comes with its own help system. But, until now, DOS itself has had no help and yet it is probably the most complicated program of all!

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in the all new DOSMATE***

**FIRST
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- Instant on line help
- Simple plain English reference
- Only uses 57Kb
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\$95**

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thought were
impossible!***

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Express, Diners Club, Visa, Mastercard or Bankcard. Plus
\$7.50 Freight ☐☐☐☐ ☐☐☐☐ ☐☐☐☐

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Address _____

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Company _____

Felix is a stationary device that works within any monitor screen size. Its resolution is 320 dots per inch. The Felix requires little desk space, works in a dust free capsule and does not require cleaning. It uses the same movement as when using a pen. A feature called Hot Spots activates pre set command macros. President will bundle it with its desktop publishing systems. Felix can be used with the IBM PC, XT, AT, PS/2 as well as Lotus 1-2-3, Cad Marke and Windows.

MA100 EPROM Programmer

Microcontrol
Phone: (02) 588 1774
Price: \$990

The MA1000 programs virtually all 24-, 28- and 32-bit MOS/C-MOS (E)EPROMS to 1Mbit 27010/27011 without any personality modules. An expansion bus is provided to accommodate adapters for less common and future programmable devices.

All programmer software is contained on board and the unit is programmed via an RS232C interface. Software updating is done simply by replacing the control program PROM. Transmission speeds of up to 19200 bits per second are available with the optional XON/XOFF software handshake.



NX 1000 CL

Star Micronics
Phone: (02) 736 1144
Price: \$619 untaxed

The latest printer from Star Micronics is the NX 1000 CL, a colour dot matrix printer. It is capable of draft printing at 144 characters per second (cps) and 36 cps in near letter quality mode.

The NX 1000 CL uses a four colour ribbon to mix up to seven colours in the printing process. It does not require special colour software to drive it. A wide variety of fonts and type styles are available. The printer also features a paper parking facility.

NetComm

Price reductions

NetComm
Phone: (02) 888 5533
Price: See below

NetComm Australia has announced price reductions on a wide selection of its data communications products. The AutoModem 1234 has been reduced from \$1099 to \$749.

The 1200 bits per second (bps) to 2400 bps upgrade available on SmartModems and In/Modems is now available for AutoModems for \$260. The In/Modem now retails at \$749, down from \$1225, and the Pocket Modem 123, which was \$499 is now selling for \$349. For further information contact NetComm.

RapidMEG AT board

CVA Computer and Peripheral Sales
Phone: (02) 476 6400
Price: Not supplied

A new add-in board for IBM ATs and compatibles has been released by CVA. Designated the RapidMEG AT, it allows for the expansion of RAM capacity to 10 megabytes.

It is configured as a master and a series of daughter boards offering a range of capacities

from 0 Mbytes to 8 Mbytes. When added to the 2 Mbyte capacity of the CPU main board this results in the 10 Mbyte total. Implementation of the board is achieved using industry standard 256 kilobyte and 1 Mbyte megabit DRAMS.

RapidRAM2 board

CVA Computer and Peripheral Sales
Phone: (02) 476 6400
Price: Not supplied

A new add-in board from CVA, the RapidRAM2, provides 2 megabytes of expanded RAM for the IBM PS/2 Models 50 and 60. The board is 100 per cent compatible with IBM's 2 Mbyte Memory Expansion Option adaptor. It fully supports version 4.0 of the LIM expanded memory specification, LIM EMS.

The RapidRAM board includes an expanded memory manager that allows easy access to extended and expanded memory without the necessity of reconfiguring hardware.

Thomson monitors

Peak Pacific
Phone: (02) 437 5566
Price: Not supplied

A range of new Thomson monitors has been released. The Thomson 44460D is a 14 inch autsync monitor that extends the

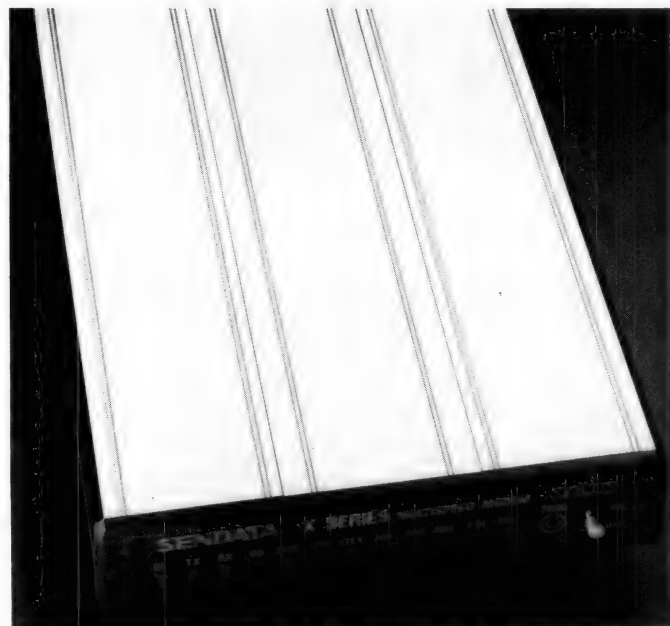
limits of EGA resolutions to 720 x 350 pixels. The 4570 is a microprocessor controlled controlled 14 inch autsync display that has a resolution of 640 x 200 in CGA mode and 640 x 480 in PGA mode. It also supports from 16 colours in CGA to 256 colours in PGA. The 4580 VGA display offers up to 1024 x 768 pixels in graphics mode while the 460W is a white phosphor monochrome VGA display that offers a resolution of up to 720 x 400 pixels in text mode and 640 x 480 in graphics mode

V-screen

Pica
Phone: (03) 370 3566
Price: See below

V-screen is a sharp, 15 inch screen display for the Macintosh SE and II. It has a hardware left-right pan mechanism that provides instant access to the V-screen's 1024 x 832 pixel virtual screen.

The monitor can display an 1/2 x 11 inch page and is compatible with most Macintosh applications. A high clock speed allows for fast screen redrawing. The 72 dots per inch screen resolution provides true 1:1 size compatibility. Applications include DTP, Cadcam, Cae, spreadsheets and graphics. The price of the V-screen for the SE is \$3190, while the price for the Mac II screen is to be determined.



X-Series

Sendata
Phone: (02) 438 4255
Price: Not supplied

The latest release from Sendata is the X-Series modem which allows for incoming messages to be stored in a 'mail box' buffer while the modem is unattended.

The X-Series modem is an intelligent synchronous and asynchronous modem with full support from 300 to 2400 bps (CCITT and Bell standards) and multiple security facilities. There is no need to reset the modem in the event of a power failure as the battery packed modem holds six complete operational profiles, dial back security information and dialling directory.

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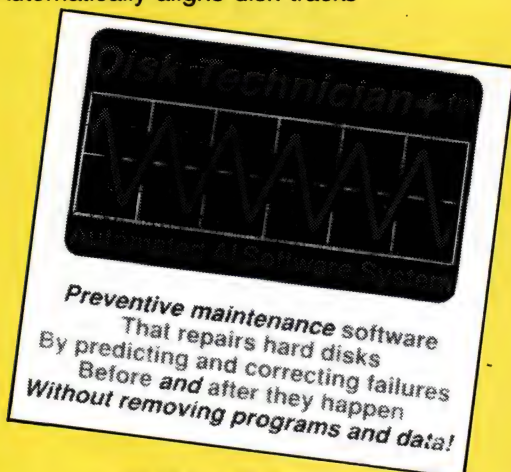
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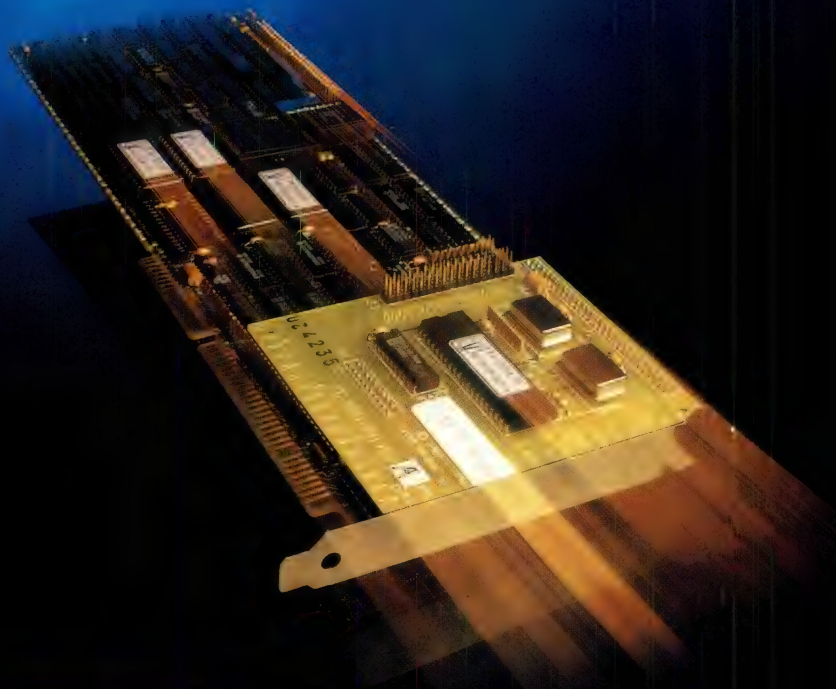
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PM3011A features:

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- Rated by Coretest* 106 times faster than the original PC Hard Drive, when tested in a 12MHz \emptyset wait state 80286 machine with a 72MB 25mS drive.

* Coretest is a trade mark of Core International

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Miscellaneous

A4 size copy holder

Computer Resources

Phone: (02) 439 3399

Price: \$85.85 taxed

The Model 81420 A4 size copy holder simply attaches to your desk to support your documents at a comfortable height. Features include a sturdy manuscript clip and magnifying line folder.

It holds up to 20 mm thickness of paper. The holder has an 85 cm spring balanced arm and load capacity of 3 kg. Other copy holders in the range include an A3 size model and a desktop A3 size copy holder that can be positioned directly below and in front of the VDU.

Coach Professional

Pica

Phone: (03) 370 3566

Price: \$399 taxed

Coach Professional is a spelling verification, online reference and hyphenation system for the Macintosh.

It includes an interactive and batch spell checker and spelling dictionary, thesaurus, dictionary with complete definitions and automatic hyphenation. Any word can be added to the Coach Professional dictionary, even words containing technical symbols and foreign language characters.

DataPerfect

WordPerfect Pacific

Phone: (02) 498 7155

Price: Not supplied

DataPerfect 2.0 is a structured relational database program. It features menu driven definition, a large data capacity, formula processor, help feature and compatibility with other WordPerfect products.

The program supports a text storage capacity of up to 510 million bytes, with data file sizes of over 2 billion bytes and over 16 million records. Each database can have up to 80 panels and each panel can have up to 80 fields. Formulae may be used to initialise field values. DataPerfect runs on the IBM PC, XT, AT, PS/2 and close compatibles. DOS 3.0 or higher is required for a network system.



The Courier 53

Future Sight Products

Phone: (02) 922 2625

Price: Not supplied

The Courier 53 is a portable facsimile/photocopier. It enables you to send or receive documents from an hotel room, office, car phone and even a phone booth in 40 seconds.

The Courier 53 may be directly connected to a telephone line, or can be acoustically coupled. It comes with its own Ni-Cad battery which can be recharged in an hour from a 240 volt mains power supply or any 12 volt car battery. Weighing only 3.3 kgs, the Courier 53 comes in its own carry case or can fit into any conventional brief case.

Adjustable Footrest

Computer Resources

Phone: (02) 439 3399

Price: \$86.76 taxed

The footsore and weary need worry no more. Computer Resources has an adjustable footrest, designed to reduce pressure from the underside of the thighs. This increases circulation and creates greater comfort for the computer operator.

Events

The Government Technology Exhibition will be held in Canberra from 7 to 9 June at the National Exhibition Centre. The National Technology in Government Conference will be held from 7 to 9 June at the Canberra Hyatt Hotel.

Microbits 88 is an introductory course on interfacing principles for IBM and compatible machines. The course is either part time (6 weeks duration, 1 night a week from 14 September) or full time (5 days) starting from the 26 June and 5 December. For further information contact the Queensland Institute of Technology, Physics department on (07) 223 2196.

Writing Better Computer Software Documentation is the topic for a course conducted by Dr John Brockman as part of Australian National University's Centre for Continuing Education program. The course will be held from 28 to 30 June. Contact the ANU on (062) 493 817.

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6 Ann Court, ASPENDALE VIC 3195
TEL: (03) 580 6424 VIATEL 358064240

Ausgraph '88 organisers are calling for unpublished papers on Cadcam, animation, image processing and scene simulation. The exhibition and conference will be held in Melbourne from July 4 to 8 at the Hyatt on Collins. Enquiries (03) 387 9955.

Building Services - A Perspective for the Future is the title of a conference to be held at Surfers Paradise by the Chartered Institution of Building Services Engineers from July 7 to 9. For further information contact the Conference Secretary, Robert Turner, 3 Paxton Crs, West Penant Hills 2120 NSW.

The Fourth National Space Engineering Symposium will be held in Adelaide July 12 to 14. Papers dealing with any space engineering are invited. Contact (062) 73 3633.

The 5th International Federation of Purchasing and Materials Management (IFPMM) Asia Pacific Regional Conference will be held from 13 to 15 July at the Sheraton Hotel, Brisbane. Contact the Conference Secretariat on (07) 371 7900.

Papers are being called for Forum '88, organized by the Honeywell Bull Users' Association. It will be held at the Sydney Hilton Hotel from July 21 to 23. Contact (02) 218 9578.

Comdex Australia '88 will be held at the Darling Harbour Conference and Exhibition Centre in Sydney from July 26 to 28. Contact (02) 959 5555.

Ergonomics is the title of a Worksafe Australia external education program to be held in Sydney on 8 and 9 August. The program is conducted by the National Occupational Health and Safety Committee. For further information phone (02) 265 7555.

Knowledge based systems in civil engineering will be discussed at a symposium to be held at Monash University from August 18 to 19. Contact (03) 565 4718 or (03) 565 4949.

AutoCad Expo '88 will be held at Centrepoint in Sydney from August 23 to 25. It will incorporate the Third National AutoCad Users' Conference. Papers have also been called for by the organisers, Autodesk Australia. Con-

tact (03) 429 9888.

Geomechanics '88 is the fifth Australian/New Zealand conference and exhibition on Geomechanics. It will be held in Sydney from August 22 to 24 at the Hilton Hotel. Contact the Institution of Engineers, Australia on (062) 73 3633.

ACE, the Australian Computer Exhibition, is to be held at Darling Harbour in September. Contact (02) 264 5337.

TADSEM '88, the sixth national seminar hosted by Technical Aid to the Disabled, will be held at the Queen Elizabeth II Rehabilitation Centre, Camperdown on the 7 and 8 October. The topic for this year's seminar is Computers Serving People with Disabilities. Contact (02) 808 2022.

Infotex '88 is a computer and communications show especially for government. It will be held from November 8 to 10 at the National Exhibition Centre, Canberra. Contact (02) 959 5555.

SST-88, the second Australian International Conference on Speech Science and Technology,

will be held at Macquarie University, Sydney, on November 29 and December 1. Contact the Secretariat at Macquarie University on (02) 805 8784.

CLUES, the C Language Users and Enthusiasts Society, is now holding regular meetings at Microsoft, 1/17 Rodborough Road, Frenchs Forest on the first Tuesday of every month.

Special Interest Groups for PC Users: CONSIG meets on the first Wednesday of each month in Sydney; contact (02) 290 2655. The DTP Graphics SIG meets on the first Tuesday of the month in Sydney; contact Mark Richards on (02) 929 5855. PCWEST meets on the first Monday of the month in Sydney; phone Bill McEwen (02) 627 2488.

A President Users Group has been formed in Sydney. It meets on the last Tuesday of each month at the Hornsby Inn. Contact Raymond Toms on (02) 212 5277.

Watercomp '89, the first Australasian conference on Technical Computing in the Water Industry organisers are asking for papers. The conference will be held from May 30 to June 1, 1989 at the Regent Hotel, Melbourne. Contact the Institute of Engineers, Australia on (062) 70 6549.

BACK⁴UP

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Overseas Exhibitions

Comtec '88 will be held at the World Trade Centre in Singapore from 25 to 28 August. Contact Paul White on (03) 663 3911.

Internepon/Semiconductor Asia/Pacific, will be held from 14 to 17 September at the World Trade Centre in Singapore. Contact Ann Theseria or Kareen Chang, Cahners, Singapore 271 1013.

The Enterprising Network Event '88 international conference is to be conducted from June 5 to 9, with the exposition running from June 6 to 8. Both events will be held at the Baltimore Maryland Convention Centre USA. The conference with be focusing on an OSI communications solution for anything from automation protocol through to banking, education and federal and state government sectors. □

YOUR AMSTRAD

This month I'll be looking at Amstrad's plans to conquer the world, a barcode reader for the PCW and a music synthesizer for the 464/6128, as well as providing a short program for the 464/6128 which will allow you to turn your 464 or 6128 into one of the world's most expensive stopwatches.

And now the world

After conquering the UK computer market and making significant inroads into the Australian PC market, Alan Sugar (Mr Amstrad) is attempting to widen his domain. Last year he bought the American company Vidco for some \$10 million, and has already put his toes tentatively into the market with the newest version of the PCW. In addition, an Italian company has been set up, and Sugar has bought the Spanish firm Indescomp for \$50 million, some four times the amount he paid a few years back to Sir Clive Sinclair for his name and computer company.

A barcode reading pen has been developed in the UK for the PCW.

Museum piece

A computer museum is being built in Britain, about 70 kilometres from London, at Reading, and an Amstrad PCW, 464 and an Amstrad PC will be among the first exhibits visitors will see. Alan Sugar is one of a number of people who have been contacted in Britain to donate goodies to this new museum.

The museum is planned to open in 1991, to coincide with the 200th anniversary of the birth of Charles Babbage, who dreamed up the world's first computer (although the technical skills of the day were not up to producing the machine he planned).

Barcodes and music

A barcode reading pen has been developed in the UK for the PCW. Called the Datalogic Datapen, it needs no extra software, is simple to install and can be oper-

ated via the RS232. The pen is available from the UK company Dialogue (UK) Ltd, on Britain (581) 95 4344.

Also from the UK for owners of the 464/6128, comes news that a multitrack, real time recording package is available. Features include the ability to store notes, to record tracks one at a time, or polyphonically. Tracks can be set to loop, play or record, and can be recorded individually or as a computer performance. Several completed tracks can be copied down to a single track, thus freeing up space for more tracks to be created.

More information is available from DHCP Electronics, 32 Boyton Close, Haverhill, Suffolk, CB9 0DZ, UK.

Big pictures

An interface box has been released to allow live data from an Amstrad PC to be projected onto a large screen with an overhead projector, using the Kodak Data-show. However, while the interface, made by the UK group Reflex, is reasonably cheap (95 pounds in the UK), the Kodak Data-show pack is not, clocking in at 1175 pounds! Those who've bought from Reflex include Jaguar Cars and the big UK munchee firm, United Biscuits.

Should I swap?

If you're an owner of an Amstrad 1512 and you're wondering whether you should consider upgrading to the recently-released 1640, the answer is 'probably not'. The major improvement in the PC 1640 is its significantly clearer display, which the computer produces as it incorporates an enhanced graphics display (EGA). However, if the picture quality of your 1512 is good enough for your needs, there is little to be gained by changing over.

Easier programming in Basic2

John Hewson of Hawthorn has put forward a simple suggestion, but one which has already saved me a great deal of time. He suggests that when programming in Basic2 on the PC set your windows up so that the Edit window covers the bottom left hand third of the screen, so a bit of the Dialogue window can still be seen, and so around two thirds of the Results-I window is still visible.

As John points out, this means that you have a large editing area to work on your

program, but can quickly select the Dialogue box when you need to, or the Results-I box to run the program. It certainly saves all the frustration I used to get by sliding the Edit window down before running a program, or trying to run a program and not being able to see what was happening.

Stopwatch

This program allows you to turn your Amstrad 464/6128 into one of the world's most expensive stopwatches. Press any key to start the time, press the Esc key to hold the display (like a lap timer) without halting the actual timing, and press any other key to halt the stopwatch.

```
10 REM AMSTRAD 464/6128 STOPWATCH
20 REM PRESS ANY KEY TO STOP THE WATCH
30 REM YOUR COMPUTER
40 MODE 0
50 WHILE INKEY$<>"" :WEND
60 PRINT:PRINT "PRESS ANY KEY WHEN YOU
  WANT TO START    TIMING..."
70 WHILE INKEY$="" :WEND
80 M=TIME
90 CLS
100 WHILE INKEY$<>"" :WEND
110 WHILE INKEY$=""
120 G$=STR$(INT((100*TIME-M))/30000)
130 X=5
140 IF MID$(G$,4,1)="" THEN X=6
150 IF MID$(G$,5,1)="" THEN X=7
160 IF MID$(G$,6,1)="" THEN X=8
170 IF MID$(G$,7,1)="" THEN X=9
180 LOCATE 13-X,13
190 PRINT LEFT$(B$,X);"      "
200 WEND
210 MODE 1
```

Listing 1. This program allows you to turn your Amstrad 464/6128 into one of the world's most expensive stopwatches.

We'll be including Your Amstrad in future issues of the magazine. I'd be interesting in hearing from any companies making hardware or software for any of the Amstrad range for review in this column. As well, I'd be more than happy to share any of your discoveries, hints, tips, comments and programs with other users of the great Amstrad machines. A free disk of Amstrad PC-specific software will be given to anyone supplying hints which are used in the column. Please write to Your Amstrad, Tim Hartnell, *Your Computer*, Box 227, Waterloo, 2015, NSW. □

YOUR AMIGA

Guru Gregg . . .

For some reason, possibly something to do with me never being able to keep my big mouth shut, I appear to have become the defacto microcomputer guru at my workplace. I frequently have people ask me what sort of micro they should buy. A typical request goes something like this: 'I'm doing a computing unit at CAE and I want to buy a computer for myself. What sort should I buy?'

Easy, right? No, not really. To advise all and sundry to go out and buy Amigas would do them a great disservice. What I try to do is find out what use the person intends to make of the machine. Some people only want the machine for word processing or spreadsheets, or they want to be able to prepare college assignments at home. If the person is using an IBM or clone at college there's not much point advising the purchase of an Amiga 500. The lack of compatibility would drive them crackers.

If the person really doesn't want graphics and music capability why pay for it. A really cheap clone with mono monitor can be had for well under \$1000, and a good second hand one for even less. The several hundred dollars saved can provide some

*When you pay out your
hard-earned for software,
insist on getting it in the
original manufacturer's
sealed packaging.*

useful software. The important thing is, to my mind, to get the person to realistically evaluate the use they will make of the machine.

For a family with school-age kids I find it very hard not to recommend the Amiga 500. There is so much good software now available for the Amiga that it really has become the force to be reckoned with. I am irritated by the frequent claims by purveyors of other micros for their 'educational software'. On closer examination this touted software usually turns out to

be poorly designed and produced *and* almost exclusively American in its spelling, content, and view of the world.

In my humble opinion (what else!), a good graphics package (like Deluxe Paint II), a good music package (Instant Music or Sonix), and a good word processor (WordPerfect or TextCraft Plus) make the best set of truly educational software your kids could have. Learning the names of American Presidents or American States no doubt has its place (for my money, the other side of the Pacific), but developing creativity and picture, sound and word skills is what education is about.

Workbench

So much for philosophy. Thousands of letters from enthralled readers of this column (well, a couple anyway) have asked for an explanation of the startup-sequence file on Amiga Workbench disks, so here goes.

The name Workbench is, in my opinion, frequently incorrectly used to describe any disk which can be used to initialise the Amiga after a warm boot (a reset performed by pressing the Ctrl-Amiga-Amiga keys simultaneously). I would rather call

```
mount vd0:
dir > nil: vd0:
addbuffers df0: 20
BindDrivers
copy c/echo ram:
copy c/assign ram:
ram:echo "A2000 Workbench 1.2 V33.53 03-APR-87"
ram:echo " "
ram:echo "Virtual Disk VD0: mounted"
ram:echo "floppy disk startup-sequence being executed"
ram:echo " "
ram:Assign WB: sys:
IF EXISTS sys:s/JH0
  ram:echo "Initializing Janus ..."
  ram:echo " "
  ram:echo "waiting for Janus initialise ..."
  Wait 25
  ram:Echo "Mounting Janus Hard Disk"
  ram:echo " "
  DJMount
  ram:echo "Hard Disk mounted ..."
IF EXISTS JH0:
  ram:Assign WB: JH0:
  ram:echo "Workbench assigned to JH0"
ELSE
  ram:Assign WB: sys:
  ram:echo "Workbench assigned to SYS"
ENDIF
ENDIF
IF EXISTS sys:s/DH0
  ram:Assign WB: DH0:
  ram:echo "Workbench assigned to DH0"
ENDIF
AddBuffers WB: 30
CD WB:
IF EXISTS WB:c
  ram:Assign c: WB:c
  ram:echo "C directory assigned"
ENDIF
IF EXISTS WB:s
  ram:Assign s: WB:s
  ram:echo "S directory assigned"
```

```
ENDIF
IF EXISTS WB:t
  ram:Assign t: WB:t
  ram:echo "T directory assigned"
ENDIF
IF EXISTS WB:l
  ram:Assign l: WB:l
  ram:echo "L directory assigned"
ENDIF
IF EXISTS WB:libs
  ram:Assign libs: WB:libs
  ram:echo "LIBS directory assigned"
ENDIF
IF EXISTS WB:devs
  ram:Assign devs: WB:devs
  ram:echo "DEVS directory assigned"
ENDIF
IF EXISTS WB:fonts
  ram:Assign fonts: WB:fonts
  ram:echo "FONTS directory assigned"
ENDIF
ram:Assign sys: WB:
ram:echo "SYS directory assigned"
IF EXISTS WB:System
  ram:Assign System: WB:System
  ram:echo "System directory assigned"
  Path add System
ENDIF
IF EXISTS WB:Utilities
  ram:Assign Utilities: WB:Utilities
  ram:echo "Utilities directory assigned"
  Path add Utilities
ENDIF
ram:Assign WB:
IF EXISTS sys:c/Setclock
  Setclock opt load
ENDIF
LoadWb
ram:echo "WorkBench loaded"
IF EXISTS sys:s/Startup-HD
  Execute sys:s/Startup-HD
```

```
ENDIF
ram:assign zing: jh0:c
ram:echo "Zing assigned .. OK"
ram:assign movie: jh0:movie
ram:echo "Movie assigned .. OK"
ram:assign wp: jh0:wp
ram:echo "WP assigned .. OK"
ram:assign maxiplan: jh0:maxiplan
ram:echo "MaxiPlan assigned .. OK"
ram:assign print: jh0:wp
ram:echo "Print assigned .. OK"
ram:assign BBM: jh0:BBM
ram:echo "BBM assigned .. OK"
ram:assign "Videscape 3d:" jh0:Videscape 3d"
ram:echo "Videscape assigned .. OK"
ram:assign objects: jh0:videscape 3d"
ram:echo "Objects assigned .. OK"
ram:assign pictures: jh0:videscape 3d"
ram:echo "Pictures assigned .. OK"
ram:assign tv*text: jh0:tv*text
ram:echo "TV*TEXT assigned .. OK"
ram:assign icons: jh0:utilities/iconmk/icon templates
ram:echo "IconMk assigned .. OK"
stack 20000
ram:echo "Stack set to 20,000 bytes"
blitzfonts
ram:echo "BlitzFonts running"
ram:echo " "
ram:assign
say "amiga two thousand, ready."
wait 3
zstart
ram:echo "ZStart running"
endcli > nil:
```

*Listing 1. An example of a
Startup-Sequence for an Amiga 2000 with
expanded memory and a hard disk.*

such disks Boot or Master disks. In any case, such disks must contain certain files and directories in order for the Amiga to initialise successfully.

Some of the vital directories required on a Boot disk are DEVS, C, T, L, S and SYSTEM. The DEVS directory contains files which instruct the Amiga how to handle the various devices such as disk drives, memory, printers and so on. The C directory contains executable files which perform particular tasks. Each of the CLI (or AmigaDOS) commands causes a file in the C directory to be executed. And so it goes on with various files in other directories.

The S directory contains a file called Startup-Sequence. This file contains a set of CLI commands which is performed whenever this disk is used to initialise the Amiga. A typical Startup-Sequence file might look like this –

```
copy C/Echo to RAM:
Ram/Echo "The Startup Sequence is now running"
Addbuffers df0: 10
If exists df1: 10
  Addbuffers df1: 10
Endif
Ram/Echo " "
Ram/Echo "Here is a list of the contents of this disk"
List df0:
Ram/Echo " "
Wait 5
Ram/Echo "Setting up Workbench"
Loadwb
EndCLI > nil:
```

As you can see, each line of the Startup-Sequence file begins with a CLI command. Let's run through this file and examine each step. The first line instructs the operating system to place a copy of the file Echo from the C directory of the current disk into an area in memory which is labelled as RAM. I have done this because I will be using the Echo command several times during this sequence. It is much faster and more efficient to read the command from memory each time it is needed, than to load it from disk each time.

The second line uses the Echo command (from RAM: memory) to print the string of text 'The Startup... running' on screen. Next the Addbuffers command is used to create a reserved area of memory associated with disk drive df0. This 'buffer' space in memory allows the drive to operate more efficiently. Next the 'If exists' command checks whether an external disk drive is connected. If it is, the next

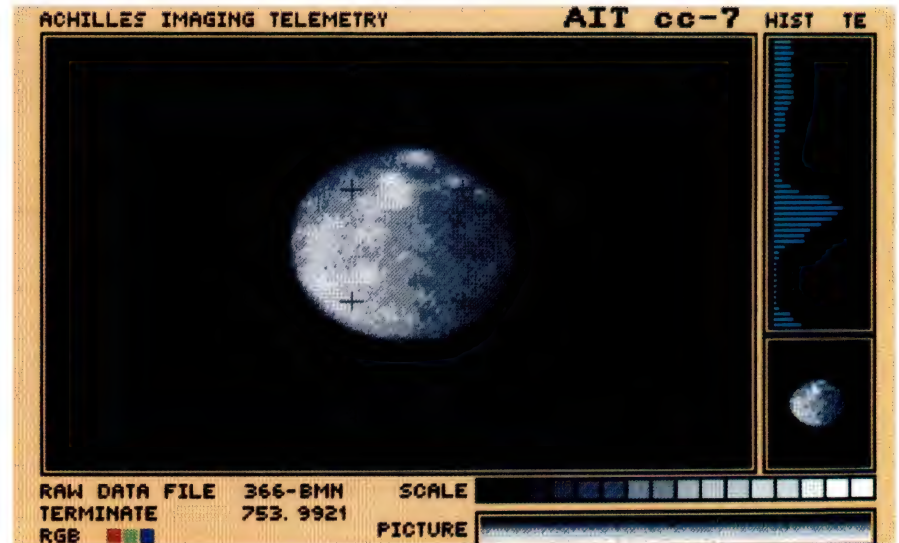


Figure 1. A screen from Probe Sequence, which was produced using The Director.

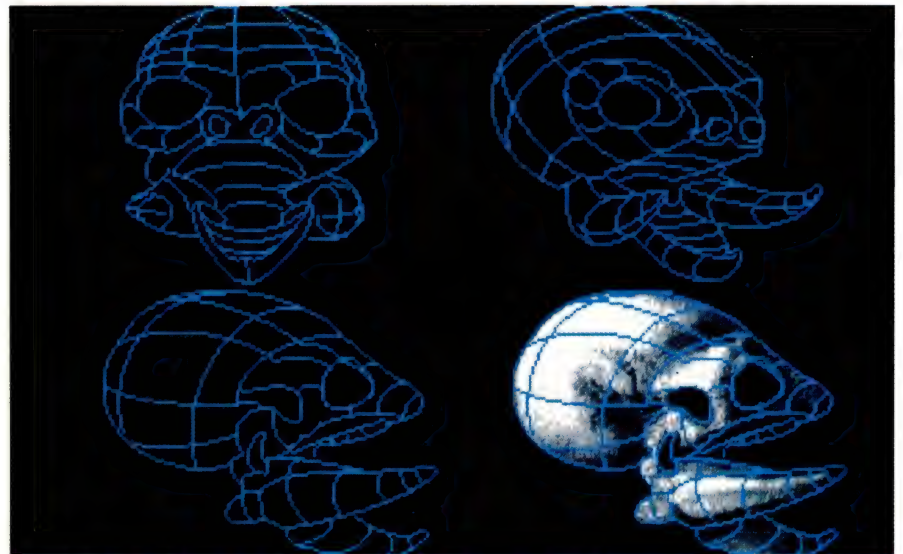


Figure 2. Probe Sequence involves a space probe finding a skull on the surface of a planet orbiting Alpha Centauri.

Addbuffers command is executed. If not, the Addbuffers command is ignored. The Endiff command simply finishes the decision sequence.

The next line simply prints a blank line on screen, just to separate the lines of text. Again the Ram/Echo command prints the text string on screen. Next the List command is used to produce, on screen, a list of the contents of the disk in drive df0:

(the internal drive). Another blank line is printed, just for neatness.

The Wait 5 command causes the Amiga to sit and do nothing for five seconds, to give the user time to read the contents list just printed. After five seconds the next command is executed. Again the Ram/Echo command is used to print a text string on screen. Now the LoadWb command builds up the Workbench environment

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YOUR AMIGA

with its icons and screen headers. These remain invisible however until the EndCLI command causes the CLI window we have been using to close, revealing the Workbench which has been set up in the background.

That's all there is to a Startup-Sequence file. You can examine the Startup-Sequence file on any of your BOOT disks (games disks and so on) simply by entering the CLI environment. Type -

COPY C:TYPE TO RAM:

and press Return. Next type -

CD RAM:

and then remove the current disk from DFO. Place the disk you wish to examine into DFO: and then type -

TYPE DFO:S/STARTUP-SEQUENCE

and press Return.

In many cases, and particularly on games disks, the Startup-Sequence may only be a single command, such as FS. This is a command which executes the file called FS (flight simulator) on that particular disk. On other disks the Startup-Sequence file may be very extensive; see Listing 1 for an example of a Startup-Sequence I use on an Amiga 2000 with expanded memory and a hard disk. If you can follow what it does, go to the top of the class.

Make a copy of a BOOT disk and use a text editor such as ED (contained in your C directory) or TxED (from Public Domain) to change the Startup-Sequence on the copy. Experiment to your heart's content - you can't damage your Amiga by making mistakes. At worst, the Startup-Sequence you create will not work properly and you will have to resort to your original boot disk to re-boot the machine.

It's a great way to learn about the CLI commands. You will find the AmigaDOS manual (from Bantam Books, \$39.95) or Faulk's Intro to CLI (\$10.00 from Compliteracy, PO Box 74, Weston 2611 ACT) important if you really want to get into tailoring your own Startup-Sequences.

Now, new software. What I call 'the third generation' software for the Amiga is starting to arrive in quantity. I regard 'the first generation' as being software which was quickly ported over from other machines, and really didn't use the Amiga's

unique capabilities at all. 'The second generation' was the first software written specifically for the Amiga, but written by people who were still coming to terms with the machine. 'The third generation' Amiga software is really using the machine's capabilities and is stunning.

This month's stunners are just that...stunning. First up is The Director which describes itself as a 'professional display and animation language for the Amiga'. What this means is a package which allows you to create presentations using IFF images, IFF sound files, and ANIM animation files. The best part about The Director is that it is very easy to learn and use.

I've tried out several animation and 'presentation' packages in the past and invariably found them very complicated and hard to learn, ineffective, or both. The Director is a very pleasant change. It won't break the bank either. At \$145 or thereabouts it is within reach of most of us - even for home use.

If you haven't already seen it, keep your eyes open for a demo called Probe Sequence, involving a space probe finding a skull on the surface of a planet orbiting Alpha Centauri. The whole demo was produced using The Director. A couple of images from the Probe Sequence accompany this article.

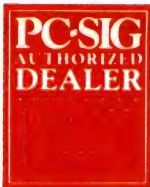
Other things this month; Dynamic Drums is a package which permits the playing of digitised sound samples, using the numeric keypad. The samples included with the package are great fun. Included are burps, 'hey's, dogs barking, glass smashing, cymbals, gongs, bells and of course drums of all sorts.

If you have a sound digitiser you can add your own samples to really build a monster. Lots of fun. Unfortunately I tried this one out at work (very briefly) and the boss is still wondering where the dogs came from.

On my hate list are Test Drive - real rubbish, and a local retailer here in Canberra who has sold at least two, supposedly new, software packages contaminated with a virus. The packages were not in their shrink-wrap seals when purchased and it looks as though this retailer is using (and copying?) software and then selling it as 'new'.

When you pay out your hard-earned for software, insist on getting it in the original manufacturer's sealed packaging. Don't listen to any rubbish about the retailer 'having to test it'. If that's his story, find another retailer.

See you next month. □



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If you decide that you don't like the software you may still keep it. You only pay the author's registration fee if you like the software and decide to use it. Manuals are included on the diskette or you can purchase our new publication "Up and Running in 15 Minutes" which covers the products marked 1 on this page.

The following is a small selection from the library:

1 **#5, #730 & #1015 PC-FILE+ (3 disk set)** 1
Jim Button's very popular database system. Works with other Buttonware software eg PC-TYPE, PC-CALC+.

1 **#78 & #627 PC-WRITE (2 disk set)** 1
The famous Shareware word processor from Quicksort. Everything you need in a word processor including spell check.

1 **#90 & #594 GENEALOGY ON DISPLAY**
Written in BASIC with concern for the novice Genealogist. As well as the expected features eg printing family trees, family group sheets, and descendants charts the program creates parentchild indexes and prints ID numbers.

1 **#105 PC PROFESSOR**
A very popular tutorial on the BASIC programming language which increases in complexity as the user progresses.

1 **#199, #1016 & #1017 PC-CALC+ (3 disk set)** 1
A new version of the popular and easy to use spreadsheet program from Buttonware.

1 **#287 & #288 FILE EXPRESS (2 disk set)** 1
Expressware's great new easy to use and much more powerful data base system. Very easy to get started as it comes complete with an on disk tutorial.

1 **#320 TOUCHTYPE**
A colorful way to improve your typing. Suits either PC or newer enhanced keyboards.

1 **#403 PC-TUTOR**
Ideal for new users to gain an understanding of your PC and how to use it. Checks on your progress with question answer format.

1 **#455, #681 & #682 PC-TYPE (3 disk set)** 1
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1 **#480 PC OUTLINE** 1
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1 **#499 PROCOMM** 1
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1 **#523 SIDEWRITER**
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1 **#524 & #525 EXPRESS CALC (2 disk set)** 1
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1 **#646 AMY'S FIRST PRIMER**
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1 **#669 & #670 GRAPHTIME II (2 disk set, Australian author)** 1
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MICROBEE FILE

Moving into MS-DOS

This month, two years ago, Microbee announced its 'strategic link' with leading Taiwanese IBM PC compatible manufacturer Mitac Incorporated, and unveiled the first in a line of MS-DOS machines – the Microbee Mitac Portable PC. Microbee hoped that by entering a standardised computing world set up by IBM, they would be able to cater for those customers wanting to access the MS-DOS plethora of software titles.

There were big hopes in the Microbee camp that this would add another dimension to the company and the range, and indeed incite old customers to look at the new machines, and draw new customers to ponder over wider computing choices. The Microbee Mitac Portable PC, however, did not go off with the expected bang. Initial sales were slow, which begs the question – why?

One can only hypothesise. Perhaps those loyal customers who had bought Aussie born and bred Microbee CP/M were disillusioned by the 'hail fellow, well met' attitude by Microbee towards a foreign import. Perhaps the Microbee Mitac Portable PC, although a good little machine in its own right, was just another competitor on the already busy PC compatible market, especially with Microbee intent on competing in the business arena. Maybe the new member befell a common fate around Microbee and was not adequately or properly advertised and marketed. However, Microbee continued on, although there were periods of fluctuating interest in the MS-DOS line internally.

Today, there is another story to be told. There seems to be a concerted effort on the part of Microbee to put real support behind its growing range of MS-DOS machines and target the education sector, where it has always competed well. Research and development at Microbee is even compartmentalised into CP/M and MS-DOS, with a lot of effort being thrown behind the marriage of the two (the DOS Box) and support being provided for the team out in the field. There is even a list of preferred MS-DOS educational software titles for those wanting a helping hand deciding which way the dollars should go.

Educational catalog

Indeed the latest Microbee publication, *The Australian Educational Software Catalogue*, has a number of MS-DOS titles list-

ed, especially in the Administration and Library maintenance areas. Microbee is at last addressing the need for more sophisticated programs, especially in these school management areas. It is nice to see the effort being made to cover all areas of the curriculum and most third party Microbee software producers (here I speak specifically of local CP/M writers).

The catalog contains over 400 titles including Administration, Foreign Languages, Great Games for Rainy Days and nine Typing programs. There are the old standard areas of course, including Adventure Games, Maths, Simulations & Logic and the Social Sciences, but something which came as a surprise and is a nice touch, is the inclusion of the title Communications. Under this heading are listed descriptions of various services that are accessible via a modem and a Microbee. So if you want to know more about ACIN, CLIRS, CALM, CTC or Information Express, check the Software catalog for a brief description and contact numbers for further information.

The renewed interest and support for MS-DOS from Microbee has prompted me this month to drag myself away from my faithful CP/M system and have a look at a couple of titles from Active Learning Systems, Algebra Graf(x) and Quizmaster. Oddly enough, these two programs are not listed in Microbee's catalog, despite the title suggesting that it is the definitive listing. This is not intended to be a slur on Microbee, as anybody who has tried to compile a software listing will attest to the inherent difficulties of the operation.

Algebra Graf(x)

When I agreed to accept MS-DOS titles from Active Learning Systems, I had not given a lot of thought to what they would be. I had encountered and indeed reviewed some of its CP/M titles before and found the whole experience, from running the programs to liaising with the ALS staff, value for money. I was set in a similar good frame of mind when sent promo material on its range; within a week, I received two educational titles – Quizmaster and Algebra Graf(x). Being a multifaceted person (both a trivia-ophile and a maths-phobic), I was at once delighted and dismayed.

I bit the bullet, borrowed a friend's Microbee Mitac, and loaded the Algebra program. Probably for the first time in my life,

I opened the manual and followed the instructions verbatim. Luckily, the ALS manuals are well written and set out step by step.

I carried out the requisite installation for the Microbee Mitac, and upon booting the program, was presented with the title screen. Pressing the space bar (or any key), presented me with a pair of numbered x,y axes and a message. I followed the manual to the letter and within minutes, I had managed to reproduce the equation in the book and its corresponding graph. A few more minutes of concentration found me zooming in and out on the graph. Within the hour I had built myself a library of equations and had completed all of the tutorial sessions. I was feeling confident with the program, although still not convinced of my algebra abilities. This, however, shows that even an amateur can use this program and all of its aspects, without having a degree in Mathematics.

So what does the program do and what are its applications? Algebra Graf(x) is a mathematics teaching tool with applications in Physics and associated disciplines. The program is, as the manual describes, 'content free'. This enables it to be used across the curriculum and across a broad range of abilities, in very much the same way as word processors and spreadsheets may be used. It is in essence a skeleton program, relying on the user – teacher or student, to manipulate and build upon it as is appropriate.

The software allows for the writing of algebraic equations as one would be able to jot down on a piece of paper. With the use of a few key sequences involving the Alt key, square roots, π and other mathematical symbols are written to the screen and form the basis for equations. For the Microbee Mitac, function keys have also been employed to make data entry easier (for example, F2 can be used instead of the Alt-E keys to achieve an exponential).

Once the equations are written using the editor, the corresponding graph is plotted on what is called the Graph Board. The program provides for a number of situations – the ability to plot a number of equations on one set of axes, or plot each equation on a separate axis, up to six of which can be made to appear on screen, all at one time.

There are three areas where Algebra Graf(x) will be of use to Maths and Science

teachers. This program will considerably reduce the amount of time you would need to spend in front of a black board, drawing equations and graphs with chalk and oversized ruler in hand. The program provides for storage and retrieval of equations to be plotted to screen as they are recalled from disk or memory.

The computer is often better than mere mortals at performing one task or another, but it is well demonstrated in the plotting of intricate equations (for example, $y = \sin 1/x$). The added advantage of Algebra Graf(x) is that one can zoom in on such graphs, for closer inspection.

The second area in which this program may be usefully employed is in classwork. I believe we are all inherent fiddlers. For students using this program, the desire to try out the various functions will only help them to become more competent with the use of the program. Algebra Graf(x) is well set out and logically follows a system of menus to lead the user from one area to another. This is ably complimented by the manual which is quite thorough. However, you will find after a few sessions, the students will rarely need to refer to the manual. They will soon be on to the real core of the program: writing equations, plotting functions and analysing results.

As mentioned earlier, this is a skeleton program. It will therefore ably demonstrate the simplest relational equations $y = 2x$ or $y = x - 5$ and the most complex polynomial and trigonometric functions.

The program, in its final major use, provides for printer output. Many schools will not be able to afford one computer for each class, let alone a computer per child. Printing with Algebra Graf(x) overcomes the problem of trying to provide for many with limited resources.

Two nice extras I stumbled upon while flipping through the manual were sections on Playing with Equations and Graphs as Art. Perhaps with reluctant students, this may be an ideal place to start.

The program is well written, and as far as I pushed it, bug free. I was fortunate enough to be able to team the Microbee Mitac with a colour monitor, and the resultant output from Algebra Graf(x) was excellent. The program is easily managed by those not particularly comfortable with mathematics (me), and therefore has the potential to be used with lower secondary maths classes, or with those who may be experiencing difficulties with Algebra. The old adage, 'a picture is worth a thousand words' is appropriate in this case, affording students the opportunity to discover and understand through their own experi-

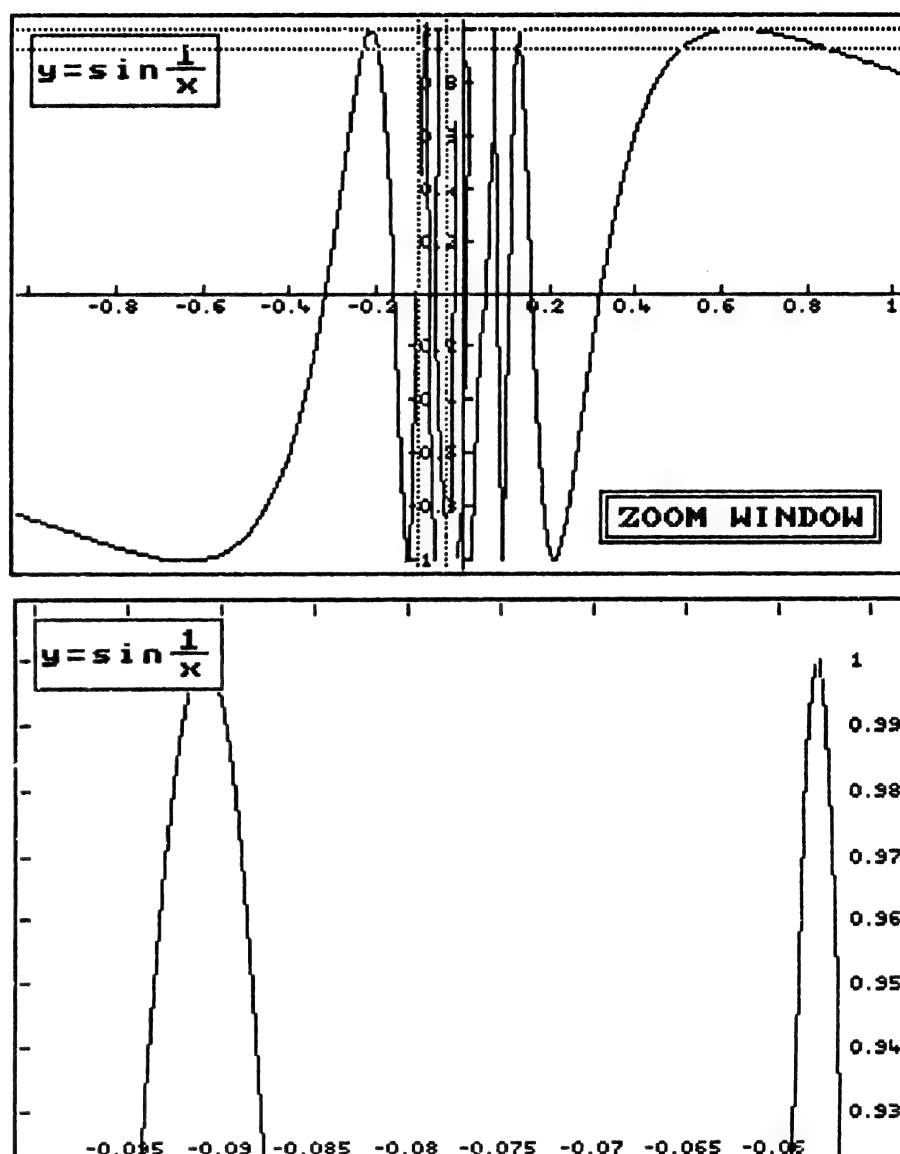


Figure 1. Graphs like these would be almost impossible to plot using the traditional blackboard method. Algebra Graf(x) also allows you to zoom in, for closer inspection.

mentation. At the other end of the scale, it would sit very well in advanced Physics classes, where the program, as a tool, could be pushed to its limits. At \$118, I believe it would be a worthwhile investment for a secondary school.

Quizmaster

Well, with one title under my belt (ahem), I turned to Quizmaster for a bit of light relief and I was not to be disappointed.

Because I had such success in getting through the previous program with the manual in hand, I employed the same tactic with Quizmaster. ALS is devoted to clear explanation in its documentation.

The manuals do not assume that you know how to initialise your disks, or run the program, but somehow they seem to convey this information without being trite or tedious.

The package comprises a manual and two disks: one program and one data disk. I inserted the initialised program disk and was presented with the main menu offering four options: Games, Utilities, Print quiz and Exit. The latter two are fairly self explanatory, but let's look at the body of the program which is based on the what can be considered essentially the output (Games) and the input (Utilities) of the program.

I selected the first option from the menu, Games, and was instructed to place the data disk in the drive. This being a Microbee Mitac Portable with only one drive, I had to swap the program disk for the data disk, however, allowance is made for systems with more than one drive.

The data disk in place, I pressed Return and was instructed to 'Get ready to play a game' (a bit of my kind of fun at last!). The program will allow up to three players to participate at one time. Each player keys in their name, and is allocated a buzzer key on the keyboard. Four speeds are available including an indeterminate period, slow, medium and fast (10, 6 and 3 seconds, respectively). Players are then offered a choice of a guessing game or a quiz game.

The quiz game presents the player(s) with a paragraph of information. For example, 'What is the name of the first woman in the Greek version of the creation legend? She was responsible for letting all the 'monsters' disease, anger, envy and so on out of a forbidden box'. To answer the question, the player presses the buzzer and selects his/her answer from the six options (either by using the arrow keys and pressing Return or pressing the corresponding number). A standard five points is added or subtracted from your starting score of twenty, on whether you were correct or incorrect. Only one attempt at the answer is allowed.

The guessing game, takes a different tack. It provides six pieces of information in succession, thereby building a description of the person, place or thing which is its subject. An example taken from the Artists group of questions: *I was born in Orleans, France in 1848 and died in 1903. I began painting as a hobby while working in a banking firm in Paris. I gave up work and devoted myself to painting though I became very poor.*

At any stage, a player is allowed to press his/her buzzer to answer the question, and as the scoring system goes, if you get in early with the right answer, you are awarded more points. The more clues it takes to get the answer, the smaller the reward. You are, of course, penalised for an incorrect answer, but the program allows you to have a number of attempts at the answer.

The guessing game and the quiz game may be played using either a random or prespecified (chosen) set. The random option asks for the number of questions required, and then selects questions from any of the categories on the data disk. The Choose a Set option takes the player to a

menu of available quiz sets. The 'flying cursor' is moved up and down the list via the up and down arrow keys for set selection. The package supplied to me contained the History data disk which included the following categories: Myths and Legends, Composers, Explorers, Scientists/Inventors, Artists and People in History. Other disks are available (for example, general knowledge and geography) by contacting Active Learning Systems.

The Utilities option on the disk is the real meat of the program. It allows you to access, edit and amend the data base and to create Quiz sets. Quizmaster is set up as most other data bases with a hierarchy of fields.

*The resulting output is
'just what the teacher
ordered' with space for
the student to write in
his/her name and class at
the top of the quiz.*

Once in the Utility mode (which I like to think of as the editing mode), there are three real options: Records, Game Sets and Categories. Selecting Records presents a list of all possible 'answers' to the questions of all categories on the disk. They are grouped together under their own headings and are in alphabetical order. Selecting a name (by pressing Return) shows all of the information stored for that field including the name, the category, clues 1 to 6, the quiz question, any additional information and 'red herring' answers.

The 'red herring' answers are those specified by the person making up the questions and answers to put the players off the track. The other three answers which appear in the game are derived by the computer, at random, from other answers in the same category. At this point you may edit this entry, the clues, the answer, the lot. You are able to alter the record, renumber the clues, save and print the record, and of course, create a new record. The manual ably takes you through these processes. Exiting from this mode sets us back to the list of all records, at which level, records may be created, deleted and copied.

Game Sets and Categories can be simi-

larly edited, altered, created and deleted. The magic of databases is that there is a wonderful interlinking between all aspects. Records can be taken and compiled into various Game Sets.

Once again, printing is highlighted as an integral part of ALS software. The program allows the user to select a number of records to be printed in the form of a written test. This option is available from the main menu. The resulting output is 'just what the teacher ordered' with space for the student to write in his/her name and class at the top of the quiz. The program automatically prints out an answer sheet for the teacher to aid in correction.

Quizmaster, like its stable mate, Algebra Graf(x), is basically a skeleton program. It does come furnished with a number of content files, but in essence, can be used and manipulated for the exact requirements of the user. It can be set to course work in the pure sciences, the social sciences and perhaps even languages and mathematics, depending on the input of the user. It can be used in both the secondary and primary school areas. In the latter area, it could be most useful in encouraging reluctant readers, especially if they were given the chance to create their own games and quizzes. The character set is big and bold and is well suited for this type of student.

Perhaps the only thing that bothers me is that there is no apparent attempt in the software to protect already created files. Without supervision it would be possible for children to change questions and answers and indeed erase whole tracts of data. This may be a cynical approach, but one worth thinking about none-the-less.

In all, I found the whole package to be good value for money, especially at the \$65 price tag for the program disk and \$25 for the data disk (it should be noted that the commercial data disks are copyright, but any data disks created by the user are their own to beg, steal or borrow). With this program, revision exercises for teachers and students alike would become more interesting. Once again, the applications of such a package are limited only to the imagination of the user.

Note that 256 kilobyte of memory is required for Algebra Graf(x), while 128 Kbyte is required for Quizmaster. Both programs run on the Microbee Mitac Portable PC and should be suitable for other MS-DOS machines in the Microbee range. ALS can be contacted on (07) 350 2500. If you'd like to know more about the company and their success overseas, see 'Active Learning Systems' in our Feb. '88 issue. □

IBM UNDERGROUND

File Express

In the past I have reviewed a couple of versions of the Buttonware database PC File. Version 2 of PC File Plus was recently released. Unfortunately, it cannot be distributed as Shareware in Australia and must be purchased outright. Fortunately there is an alternative in File Express, now available as version 4.01.

File Express can have up to 16,000,000 records, up to 120 fields per record and up to 250 characters per field. The free space on your disk will be the actual limit to the biggest database you can create.

Installation

File Express comes on two 360 kilobyte floppy disks, one for program files and the other for support files. On systems with hard disks (strongly recommended but not mandatory) merely create a new sub-directory for the files and copy them across. On systems without hard disks at least two floppy drives are required; one for the program and support disks, and the other for data disks. Use with a single disk drive is not practical. Other system requirements are that the system must be running PC-DOS or MS-DOS 2.0 or higher, and must have 256 Kbyte of memory.

Running

The main File Express program is FE.EXE, and it in turn chains to other program files as required. When starting FE.EXE from the DOS prompt the default configuration can be used, or optional parameters can be used to force it to monochrome (for mono monitors on CGA cards) or turn off the sound. A third option uses BIOS calls to write to the screen, instead of directly writing to the video hardware. It is very useful, allowing File Express to be used on almost any MS-DOS machine, and not just ones with very IBM-compatible video. It also allows File Express to be run within a window in Microsoft Windows.

First a welcoming banner screen appears. One can then get more information on the ShareWare principle and on the various products from ExpressWare (creators of File Express) or proceed straight into File Express. After selecting the drive and directory for the data files (the default is the directory in which File Express is found), another screen appears which has a list of the databases in the selected data directory. Each database name has a number beside it, and entering the number

and pressing Enter loads the database. Selecting an existing database takes one to the main menu, while pressing Enter without selecting a database detours via the define-a-database routine before getting to the main menu.

Defining a database

The Database Definition module displays a screen with five columns, for Field Name (up to 12 characters), Field Type, Field Length, Format and Index Length. Field type can be Character, Numeric, Formula, Date, User Defined Mask or Text Formula.

After selecting the drive and directory for the data files (the default is the directory in which File Express is found), another screen appears which has a list of the databases in the selected data directory.

Fields can be up to 250 characters long, while the index length defaults to 2 characters. When numeric fields are specified, the user determines the number of decimal places, from 0 to 3.

Having defined the individual fields, the user can Save, Change, Insert, Delete, Resume, Paint or change the Index Length. Paint allows a field (and its name) to be selected with the Tab keys (Shift-Tab selects in the reverse order), and the cursor keys allow the field to be moved around the screen. If another field is encountered on the way, the moving field merely jumps straight over it. In the paint routine, headings and labels on the screen can be defined, and these could include boxes around various parts of the screen.

Main menu

Once a database has been selected, or a new database has been defined, the main menu appears. At the top right of the screen appears a box showing the version of File Express in use, along with the date and time. At the bottom left is the name of the current database and the number of records in it.

Nine options are available from the main menu. These are Open a Database, Add New Records, Find Records, Sort the Index, Report Writer, Label Printing, Maintenance, Import/Export/Clone or Quit to DOS. They are selected either by pressing the first letter of the option, or pressing a number key from 1 to 9 shown next to each option.

Add new records

Selecting Add a Record brings up a blank record ready for the user to fill in. The up and down arrow keys can be used to take a reverse video bar to any field for filling in, or pressing Enter takes the cursor bar to the next field. Pressing F10 saves the record and brings up another blank screen, while pressing Escape takes one back to the previous menu without saving the information on the screen.

Find a record

Under the Find A Record option on the Main Menu is another menu, from which one can select Find A Record, Quick Scan Mode, Search and Replace, Search and Delete, Find Duplicates in One Database and Find Duplicates in Two Databases.

Selecting Find A Record brings up a screen, showing the names of the fields in the database at the left, and at the right giving brief details of the possible logical tests which could be placed on the data. If Find A Record is requested, then File Express searches the database and displays the first record which matches the search criteria.

If Quick Scan Mode was selected, the user is prompted to specify which fields are to be seen; 20 records are then displayed, 1 line per record, with around 70 characters being seen, in the order that the fields were specified for display. Alt-D skips between showing deleted records and skipping deleted records. PgUp and PgDn show the next and previous screens, while Home and End show the first and last screens. One record is shown in reverse video, and this reverse video cursor bar can be moved up and down with the

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cursor keys. Enter displays the record under the cursor in full.

Having found a record matching the search criteria, one can move to the next or previous record in the database, or re-start the search. A selected record can also be modified or deleted. The one thing I missed in File Express compared to PC File was that File Express can only find a key word or phrase at the start of a field, while PC File has an additional option of finding a key word or phrase buried anywhere within a field.

Sort the index

File Express maintains separate datafiles and index files, so that sorting a database does not involve rewriting the entire database but just sorting and rewriting an index file which points to the records in the datafile. File Express allows the user to sort the index on up to 10 keys, and selects the field, and the starting and finishing points within that field, for the sort. Any one key can be sorted in ascending or descending order.

To compare sorting speed of PC File Plus Version 2 with File Express 4.01, I loaded a database with 1418 records into each and sorted it on one key. PC File took 56 seconds on a 4.77 MHz PC, while File Express took 83 seconds.

Report Writer

The Report Writer routine allows one to design a new report, or to choose an existing report. Another option allows the user to sort the index before the report is printed. When designing a report, a screen appears with three sections - Report Title, Headings and Detail. Multiline reports are easy (try that with most low end commercial packages). Once designed, a report can be saved for use or modification.

The user can select a range of options when printing the report. Paper width in columns can be set from 40 to 250 columns, left margin from 0 to 99 characters, top margin from 0 to 99 lines and line spacing as 6 or 8 lines per inch. Removal of blank lines from the report can be selected, and the user can allow or prevent splitting of records over page breaks. The length of page in lines and the number of lines to be printed per page can be selected along with normal, compressed or 12 pitch for character spacing. The final option allows for the paper to be advanced to the top of the next page with form feeds or with multiple line feeds.

Now the user can decide if all records are to be printed, or if the report should only include selected records. The report

can be sent to printer, screen or disk, and can be output to LPT1, LPT2 or LPT3. While printing, the report can be paused by pressing the spacebar, and can be re-started. When the report is finished, the user is returned to the print-a-report submenu with two more options (Edit the Current Report and Print the Report Again).

Each database name has a number beside it, and entering the number and pressing Enter loads the database.

Other options

File Express has many more available functions. One option, rather similar to the Report Writer option, allows for creation of mailing labels. The Maintenance menu allows one to change the database specifications, including field names, types, lengths and screens, and can also define up to nine macros. Datafiles can be imported and exported in MailMerge, DIF, WordPerfect Merge, fixed length and SDF formats, and databases can be cloned and merged.

Documentation and availability

A 26 page evaluation manual is included on the disk, and when users register they get disks containing the latest versions plus a printed 310 page manual. I have not seen the full manual, but found the manual on disk to be well written and quite adequate when evaluating the product before registration.

File Express 4.01 is a product of ExpressWare Corporation, PO Box 230, Redmond WA, 98073, USA. Evaluation copies are available from most user groups in Australia (fully functioning but with that abbreviated manual) or from the YC bulletin board. Registration is \$69.95 and postage to Australia \$US10.

Conclusion

I found File Express to be a highly competent database, a little easier to learn and use than PC File Plus but at the cost of a little power and speed. Both are far more powerful than most low end database packages in the around \$200 bracket, and are strongly recommended. □

YOUR IBM



As I write this, it is only a couple of days since the PC 88 show at Darling Harbour in Sydney, though by the time you read it some more time will have passed. I saw a few interesting things, defined a couple of trends and otherwise enjoyed myself. You are sure to have heard of, or seen, some of the things on display, but an overall impression of the feel of the show is probably more interesting than who had what '386 on display.

The new Exhibition Centre made life much easier for visitors and exhibitors than the formerly cramped quarters at Centrepoint. It was a joy to see large and small exhibitors with new products along with the familiar ones. My greatest disappointment was that some of the heavy-weight companies like Microsoft and Apple were not there, though IBM had a big stand and software publishers like Lotus, Ashton-Tate and others were ably represented.

One big surprise was how few add-on boards for the microchannel were on display. Another was that effectively no one but IBM was showing OS/2 running on their machines, or offering software to run under OS/2. After reading of the many products offered at recent US trade shows in the hardware line for the microchannel, and hearing of many imminent software products for OS/2, I really expected to see far more of them. Having recently (briefly) used OS/2 I am convinced that it is the way things will go in the very near future, and am eagerly awaiting more software for it. (See my review on IBM's PS/2 Model 80 this issue.)

A host of clone add-on boards for XT

and ATs and clone PCs were very much in evidence. Going round the other stands revealed a great number of PC and AT clones, and a great variety of '386 machines. Laptops were in abundance, and this could well be the year that they take off as the ability to have full power without having to give up the whole desk as a site for the system unit becomes more and more attractive.

One of the oddest things was that several clone makers had adopted the Model 30 layout for their machines, with 8088, 8086 or 80286 processors in a thin case, with three horizontal expansion slots, 3½ inch floppy drives and with serial and other ports on the motherboard. All used the old XT or AT bus, and no clones of the PS/2 microchannel bus were seen.

A few products caught my eye, and were a little out of the ordinary. As yet I have not had the opportunity to fully review any of them, and so my impressions are just that – a first look at some items that could solve someone's problem. A full review could reinforce or refute the impression, but they appear worthy of investigation.

Knowledge Network

The first of these products is Knowledge Network. It is a local area network (LAN) which does not require any specialised cards. The serial ports of several machines are connected together with simple cables, much like telephone extension cables. An adapter is fitted to the serial port on each machine and the cable merely plugged in. In this simple form, Knowledge Network has been around for a while. It was limited to sharing of files,

and lacked the ability to have multiple users read or update the same file simultaneously.

At the show a major enhancement to the software was announced. It is now claimed to be NetBios compatible and should allow multiuser access with appropriate applications software. A full review will follow when production copies of Knowledge Network's new software are available, but it does seem to offer a good solution at a reasonable cost at the slower end of the LAN market. Knowledge Network is distributed in Australia by PC Extras of Sydney (02)-319-2155. It costs around \$299 per PC.

StyleWriter

Australian software has long had a Cinderella image, often being under capitalised and rushed out without proper presentation and documentation. Not so with StyleWriter, a product that takes the place of an editor in the corporate and governmental sector. It comes as a well thought out and easy to use package, and the manual (nearly 2 cm thick) is beautifully written, laid out, illustrated and printed.

When I say that StyleWriter takes the place of an editor, I don't mean it is a piece of word processing software that allows one to write or modify a document or file. It is a package that reviews an author's written output and suggests improvements. We can always get help from a second person who takes a look at the product of our pen or word processor and gives it the enhancement that a second eye can offer. StyleWriter takes a first look, before the human editor, and gives an amazing amount of help and suggestions to improve one's writing.

StyleWriter finds overly long sentences, jargon, excessive use of passive voice, legal words, clichés, redundancies, tautologies, sexism and more. It can display each defect on screen and describe the problems it has found, or print out the document with footnotes on each page showing suggested improvements. The program clearly, easily and inoffensively suggests ways of improving written communication.

StyleWriter can read ASCII, WordStar, MultiMate and Microsoft Word files. It cannot correct the source file, and the user either marks up the printout from the original word processor, or gets StyleWriter to create a printout with footnotes.

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A breakthrough in professional development tools for C programmers. Really fast & flexible WYSIWYG screen environment that will reduce your screen design times to a fraction of what they were. Import screen designs & automatically turn them into C code. **\$595.**

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This is not a major disadvantage as, after modifications are suggested, a time for reflection and consideration will surely result in a better product than rushing straight into modifying the document on the run.

Style Writer is a product of Editor Software, (062) 51 5261. Retail price is around \$360.

OURS multiuser system

There are two common approaches to multiuser computing, with several users all having simultaneous access to read and update data. Mainframes (or minis) can be connected to multiple terminals, or several PCs can be connected by a LAN. A few times there have been attempts to connect several terminals to a PC. Generally these were failures, as the single processor could not cope with the processing demands of several users. Another problem with multiterminal PCs has been that they often offered simple character displays, and could not display graphics. Usually they could not even display text from programs like Lotus that write direct to screen memory.

One solution was to add a card into the PC for each terminal, with an additional processor on each card. While these overcame the problem of insufficient processor power, they often still could not show graphics or handle character displays written directly to the video.

At the show was the OURS system. Here, a card with a processor and video circuitry is added to the host PC for each remote terminal. A cable is run to each remote location and at that point is connected to an interface box. A normal PC monitor and keyboard plug into the interface box, and can display graphics and text written directly to screen memory. Available on the slave card are 8088 and 80286 processors, as are CGA, Hercules and EGA video. Novell compatibility is claimed, and proprietary multiuser software is available. Distributor of the OURS system is Hadosun, (062) 54 7228.

Verbatim 10 megabyte floppies

There have always been two problems with floppy disks. They are too small (in storage capacity, not size) and they are too slow in recording and retrieving information. With the new Verbatim floppies and drives, neither speed nor storage is a problem. At the show they had floppy storage systems with three different capacities. Formatted capacity is 10, 5.5 or 2.8 megabytes. The 10 Mbyte disk is a

5 1/4 inch floppy in a hard plastic shell very similar to the familiar 3 1/2 inch floppy, while the other two come in a flexible sleeve very similar to the standard 5 1/4 inch floppy. Access times for the smaller units are similar to those for floppies, while the 10 Mbyte unit has access times a little faster than for the IBM PC XT hard disk. Drives are available for IBM PCs, and may be fitted internally or mounted externally. I saw them on the McQuarrie Management Services stand. Contact them on (02) 958 2945.


Updates

A few other items have come my way recently, and deserve a quick mention even before they can be fully reviewed. In the April 1988 issue I reviewed the Norton Guides and Microsoft Word, and some matters mentioned there are now due for an update.

In the Guides review I hinted that more databases were on the way. Before the review was even printed, one was released. It is a database for programmers creating applications for OS/2, and has much detail of the new operating system from the programmer's perspective. Along with it comes a new database engine which runs directly under OS/2. The existing database engine can be run either under DOS or from the OS/2 DOS Prompt (the so-called Compatibility Box). All the existing databases, and the new OS/2 databases, can be run by either the DOS engine or the OS/2 engine. Norton Guides are distributed by PC Extras (02)-319-2155.

With Microsoft Word, my one item for the wish list was a method of previewing complex screen formatting like multiple columns on a page, inserted graphics or side by side paragraphs. Microsoft has announced a \$99 package called PageView which does just that. It also allows some editing and layout changes and saves them back to the Word file. It can be run alone or under Microsoft Windows, though the graphics integration requires Windows. It sounds like the answer to many a problem, and I am eagerly awaiting a review copy. PageView is from Microsoft, (02) 452 0222.

Enough of the child-in-a-candy-shop syndrome. I had fun at the show, saw a lot of old friends and saw many exciting machines and software packages. I still don't know which 80386 is going to be the winner in the marketplace, or which desktop publisher will prevail, or if either Apple or IBM will convincingly beat the other. The pace for '88 is as fast as ever. Hang on for the ride! □



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YOUR C64

Smart cash registers

One of the things I like best about computers is the way they inspire innovation. I've seen people apply Commodore computers to some pretty unusual and clever applications, but I have to admit that one I saw in Adelaide recently takes the cake. At a bottle shop checkout I found a C128D masquerading as a cash register!

With a bit of fiddling it is possible to use this fact to enable the additional keys in 64 mode.

Actually it was a bit more than just a cash register, because it did a lot more than merely count the dollars and open the till. It had been programmed with a complete product and price description of the 2000 plus items in the shop, and each time it made a sale it recorded the details to disk. Each night the store's Wang 2200 business computer would call up the 128D and poll it for details of the days sales and, if necessary, update the product price list. In this way the 128D was actually functioning as a 'smart' cash register, providing the store manager not only with complete daily cash sales breakdown, but also with stocktaking details.

Smart cash registers are not new, but they can be expensive. They can easily cost \$10,000 or more, but this 128D system cost less than \$4000 all up, including the till and necessary cables to connect to the Wang.

The system was developed by a local Adelaide company called Distinctive Data Services of 182 Wright St, Adelaide, (08) 212 2822. It all began when the company decided to explore the possibilities of 8-bit computers, reasoning that even 8-biters have sufficient processing power to handle a cash register's functions.

They looked at three systems, the Microbee, the Amstrad and the C128D. The 128D won the day, mostly because of the ease of programming in its advanced Basic 7.0, but other features which swung in its favour were its detached keyboard



Figure 1. The 128D system at 408 Beverages which functions as a 'smart' cash register, providing the store manager not only with complete daily cash sales breakdown, but also with stocktaking details.

and the ability to simultaneously output to two monitors. (The 128 outputs to an RGB monitor in 40 or 80 column mode, and also to one 40 column composite video monitor). This means that the system can be configured to drive one monitor facing the customer, and one for the operator.

The store, 408 Beverages, has been operating the system for eight months and despite being located just near the open entrance and its attendant dust/humidity, the system has proven remarkably reliable. The keyboard performed flawlessly, but initially there were some unexplained problems with the 1571 disk drive. These appear to have been due to undocumented bugs in the the old 1571 ROM because they disappeared with the installation of the latest versions.

Some 128 in 64 mode tricks

When Commodore launched the C128, it made a lot of mileage by highlighting its C64 compatibility. According to the brochures, the 128 in 64 mode would run 100 per cent of 64 software and by and large the claim was true. (Commodore conveniently neglected to mention that the 1571 disk drive wouldn't load a small percentage protected software, but that was the disk drive and not the C128). Anyway, the point I'm getting to is that while a C128 in 64 mode functions like a 64, it hasn't completely lost all of its 128 features.

The processor chip in the 128 is different from that in the 64. It can emulate the 64's 6510 processor because it contains the same instruction set and responds to

the same opcodes, but it has additional features. The 128 also uses the 8564 video chip, which is a superset of the 64's famous 6567 VIC-II video chip. Both of the new chips have additional address lines, and these can be accessed even when in 64 mode. Unfortunately real C64 users can't use these features – they are simply not there. But if you have a C128 or 128D and you use it a lot in C64 mode, both of the routines with this column could well be useful.

One of the extra lines on the new video chip is used to read the additional 24 keys on the 128 keyboard. With a bit of fiddling it is possible to use this fact to enable the additional keys in 64 mode.

Numeric keypad

The 64 normally reads its keyboard by triggering an interrupt every sixtieth of a second. When this happens the computer stops whatever it was doing and goes through a procedure which, among other things, checks for a keypress. After its business is done, the interrupt returns control to the program that was running. The program in Listing 1 diverts the normal interrupt routine so that it first executes this special routine. The code simply polls the additional keys (not all of them – just the numeric keypad and cursor keys), and then activates the standard routine. You should save the program before running it.

There is a catch. The machine code part of this routine starts at \$C000 (or 49152 decimal). This is normally safe from any Basic program, but it is an address commonly used by commercial software. The program will work when you first run it, but if you load a program which overwrites the 49152 address, our newly created interrupt routine will be jumping into a void. The computer may crash! Bear that in mind when using it. RUN/STOP RESTORE will disable it, Sys 49152 to re-enable it.

It is possible to write a 128 mode boot program that will switch to 64 mode and run a program. A few of the programs that claim to be 128 'native' code, actually run in 64 mode and use that technique plus this routine to give the false illusion of 128 mode. Inevitably the slow 64 mode disk access speeds give them away.

Fast mode

The 8510 main processor chip supports two speeds. In 128 mode you have the choice of Fast or Slow modes. Fast mode is exactly twice as fast as Slow mode; the processor chip is performing executions at double speed. On the 128, Fast mode is

only fully available in 80 column mode. In 40 column mode the video chip can't synchronise with the processor's higher speed and so the screen is blanked. The 64 doesn't have this automatic feature, so you will see garbage on the screen, but you can still get the processor to do its stuff.

It only takes a single POKE to turn on Fast mode. Location 53296 is the key. Normally this is a zero, but if you Poke a value of one in there you will enable Fast mode. Listing 2 is a short program designed to demonstrate the performance difference.

Before running this program I suggest you put REMs in front of lines 30 and 60.

This will disable the Fast mode and allow you to see how long it takes to perform the sample calculation at normal speeds. It will also reveal any bugs caused by typing errors. If you crash this routine in Fast mode you may have to power off in order to recover. If all is well, delete the REMs and run it in Fast mode. Twice as fast, but see the screen garbage while it's running!

Note that this trick cannot be used for disk, tape or RS-232 I/O operations. Not surprisingly, these 64 operations rely upon precise kernal timing routines which are dramatically upset by the double speed, but its fine for number crunching or drawing graphic screens. □

```

10 for i=49152 to 49271
20 read a:poke i,a:x=x+a:next
30 if x<>13353 then print "data error":stop
40 sys 49152:print "numeric keypad enabled"
49152 data 120,169,13,141,20,3,169,192
49160 data 141,21,3,88,96,169,248,141
49168 data 47,208,169,255,141,0,220,205
49176 data 1,220,208,10,141,47,208,74
49184 data 141,0,220,76,49,234,160,0
49192 data 140,141,2,169,251,141,47,208
49200 data 162,8,173,1,220,205,1,220
49208 data 208,248,74,144,9,200,202,208
49216 data 249,110,47,208,176,234,185,95
49224 data 192,16,7,162,1,142,141,2
49232 data 41,127,133,203,169,255,141,47
49240 data 208,32,72,235,76,126,234,64
49248 data 35,44,135,7,130,2,64,64
49256 data 40,43,64,1,19,32,8,64
49264 data 27,16,64,59,11,24,56,64

```

Listing 1. This program diverts the normal interrupt routine so that it first executes this special routine. The code simply polls the additional keys and then activates the standard routine.

```

10 x=10
20 t1$="000000"
30 poke 53296,1:rem turn on fast mode
40 for i=1 to 2000
50 x=x+i/x:next
60 poke 53296,0:rem turn off fast mode
70 print t1$:print

```

Listing 2. A short program designed to demonstrate the performance difference in Fast and Slow modes.

YOUR MAC



Breakout at the Apple Corral

When you consider that only a few years ago the Mac was exclusively a 128 kilobyte self contained unit tightly sealed in a plastic box, it is quite remarkable the way the present generation is breaking out of its design constraints while retaining (mostly) compatibility with the past.

We've now got links into most of the major local area networks (LANs), direct connections with DEC and the IBM PC world, Unix, drivers for sophisticated printers and optical storage devices, and a host of other more esoteric links into Cad-cam, music synthesis, online storage and sophisticated databases.

Apple's newly announced strategic arrangement with Digital Equipment Corporation (DEC) has tended to overshadow other arrangements that Apple has been forging in the computer world, to the point where Apple-DEC connectivity might appear to be setting the direction for the Mac in the business marketplace –

just as A-UX Unix appears to be designed to establish a beachhead in the university and scientific research worlds.

The DEC link is important, of course, mainly for the credibility that DEC gives Apple in the corporate sector. But an examination of the company's numerous, but less publicised, alliances and arrangements also contribute to understanding the Mac's future directions.

Apple, the company that stood alone against the dictatorship of IBM, has finally reached an arrangement with IBM itself: a milestone in anyone's guide to the future. It recently made a deal which allows IBM to use the Mac's 'look and feel' under Microsoft's Windows with IBM's OS/2 Presentation Manager. It's hard to believe – but the deal has been confirmed by IBM.

Could you imagine a few years ago that Texas Instruments (TI) would be working with Apple on a Lisp microprocessor which will be bundled with specially converted Mac IIs intended for artificial intelligence work? TI will sell the machines under the tradename Micro Explorer, and

these machines will jointly carry Apple and TI logos. It is only a couple of years ago that TI and Apple were bitter enemies.

In the past year or so Apple has also been on a corporate buying spree. It has taken a major interest in Touch Communications, an Open Systems Interconnect (OSI) networking software house – supposedly to develop OSI software for the Mac environment, and about the same time it openly committed itself to the OSI and X-400 standards.

More recently Apple bought Network Innovations, a US software house which focussed almost exclusively on VAX connectivity. Apple admit that this purchase is central to its expansion plans – primarily because it allows them to take control of the Standard Query Language (SQL) based CL/I connectivity language designed specifically for creating Mac-to-mainframe applications.

CL/I will provide the path for Apple to link into OSI, SNA 3270, APPC/LU6.2, Decnet and Appletalk – so it has obviously made a strong commitment to LANs as the medium of exchange between different systems. In the past Apple has appeared to be only marginally interested in large scale networking.

Network Innovations has been directed by John Sculley to concentrate now on linking Macs to IBM databases, and on supporting MS-DOS and the new OS/2 workstation environments. Rumour has it that Apple intends to give developers free access to CL/I if they are scripting multi-vendor connectivity applications.

Network Innovations has demonstrated the use of CL/I in its own Hypercard-to-VAX application which allows that exclusively-Mac program to use data held in DEC's VAX databases. Blyth Software has also used CL/I in its Omnis SQL Connectivity Package, and the fabulous 4th Dimension from Acius is also being upgraded with CL/I links.

Database and Hypercard links are priorities when talking about Mac-to-mainframe connectivity, and here the promises are running wild. Odessa Corporation has shown a version of its popular database manager (now called Helix-VMS) which it claims will handle the notorious VAX RMS files, and Alisa Systems has Sequelink which lets Hypercard users access information stored in Oracle databases, and also Make Easy which seems to be a DEC-emulation product.

Opening up

The recent MacWorld Expo in San Francisco, and Apple's involvement in Dexpo (the DEC users show), left no doubt that the Mac is being opened up to the outside world by encouraging third-party development. At the same time Apple has vastly improved its AppleTalk PC program (which allows file exchange with MS-DOS), and many exhibitors at MacWorld were showing IBM PC-compatible products.

This flurry of Mac-to-other connectivity reveals some change in direction of the company – and a loss of the old 'go-it-alone' philosophy. It also demonstrates how much the old closed architecture of the Macs, up to the Mac Plus, were holding the system back.

It is no coincidence that Apple's strategic alliance with DEC and moves in wider connectivity fields have closely followed the release of the Mac SE and II with their slots. Apple itself finally seems to have learned the lesson it originally taught all other computer manufacturers about the long term advantages of open architecture with the Apple II series.

Colour

Colour has also come to the Mac with vengeance. The Mac II, with high-resolution colour monitors and a range of colour boards, is superior to anything on the market at twice the price for Cadcam, graphics, and desktop publishing (DTP). And now the SE has a plug-in colour board from Orchid Technology called the ColorVueSE which can handle 16 colours from a palette of 4096. It can be run either with Apple's own high resolution RGB monitor, or with any IBM VGA compatible monitor.

On the colour front, I should also mention the appearance of Sharp's JX-450 desktop colour scanner which can handle both standard reflective images (up to 45 by 30 cms) and transparencies (up to 30 by 20 cms). You can select resolutions up to 300 dots per inch, and the reproduction is in 6-bit pixels which provide a fair range of colours and tones.

Barneyscan is also making a new colour scanner to handle 35 mm colour slides, but it reproduces the colours and tones in 8-bit pixels. The company says this gives an image quality comparable with the best colour reproduction you will see in any magazine.

With these hardware advancements and the new colour graphics DTP software now coming on the market, the Mac II appears at last to be launching into professional printing and layout areas. It is now possi-

ble to produce a high quality full colour magazine from original copy to final film separations on a Mac II – although the peripherals and software you will need will set you back the best part of a \$100,000.

MacLap?

At the less specialised end of the market, the Mac laptop (MacLap?) seems to be a reality, despite denials and evasions from the company. Some journalists in the States claim to have seen a company specification for a 5.4 kg portable version of the SE, codenamed Laguna.

You've always got to be careful with Apple rumours and codenames. The company often uses different codenames in different areas (to keep track of leaks), and they are not above floating a few rumours themselves to spike opposition PR – as do IBM and the other computer majors. But Laguna, at least, appears to be a real product in the testing stage.

The most innovative thing about the design is the use of an 'active matrix liquid crystal' display, which incorporates one transistor behind every pixel on the screen. Reports say that the screen will have a resolution of 640 by 400 pixels.

How much this advances flat screen technology remains to be seen – but obviously Apple is going all out for low power consumption at a time when backlit super-twist screens are starting to eat up the battery power at an amazing rate. Apple are planning for a worktime of 8 hours on a single battery charge, which is about twice as good as many laptops get now.

Apple is using CMOS chips throughout to cut power requirements, and it has apparently dumped the standard Motorola 68000 CPU in favour of a 68HC000, which uses only a tenth of the power and runs at twice the speed. Most of the internal functions of the machines have been compressed onto two-micron Application-Specific ICs (ASIC), which save both power and space.

ROM and RAM expansion (up to 4 Mbytes) will be by plug-in modules the size of a credit card (but thicker) and these can be inserted and removed without opening the case. Memory is constantly refreshed even in the sleep state, so you don't need to constantly save to disk. One or two 800 Kbyte drives will be available, with an optional 20 Mbyte hard disk.

Apple is getting over the problem of using a mouse on your lap (a real problem for people with hairy legs!) by providing an optional trackball which fits into the numeric keyboard space alongside the regular keys. Expect to see MacLap about June. □

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All Contributions: should include your name, address, and home and office phone numbers (in case we need to check details). Each page of your submission, and any material sent with it, should also carry your name.

Contributions by Telephone: Contributors who have modems and suitable software (in the MODEM7/YAM mould – see our stories on Christensen Protocols in the May and June 1983

issues) can arrange direct transfer to our computers through our Bulletin Board system, which is on-line 24 hours a day, seven days a week. Contact our office by phone for details on transferring material in this way.

Contributions on Disk: Contributions can be accepted in most disk formats, although some have to be converted outside our offices, which will add to the (often lengthy) delay between receipt and acknowledgement. The preferred medium is IBM standard format single-sided, single-density, 20 cm CP/M disks or IBM PC-DOS minifloppies. We can also handle, in-office, most soft-sectored 13 cm disks, thanks to PC-Alien – so unless you have a particularly strange format, send it on disk straight from your machine. Please pack them extremely carefully if posting and label all disks with your name, address and phone number.

Listings: Unless it is absolutely impossible, we want listings produced on the computer. This reduces the risk of error? if the computer typed it, the computer probably accepted it. Print listings with a dark – preferably new – ribbon on white paper, and try to format the output to a narrow (40 characters) width. If they can't be produced on a printer, borrow a good typewriter – hand-written material is likely to sit around the office for a year before someone can find time to type it all out for you! Please provide an account of what the program does, how it works and so on. Any comments on the program should refer to the address, line number or label rather than to a page number. Any comments on modifying the program to work on other machines will be appreciated. Try to include a printout of at least part of a sample run if possible.

Style: All items should be typed (or printed) and double-spaced on plain white paper. We will only accept original copies? no photostats. Include your name, address, telephone number and the date on the first page of your manuscript (all manuscript pages should have your surname and page number in the top right-hand corner). Be clear and concise, and keep jargon and adjectives to a minimum. □

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FREE READER'S CLASSIFIEDS

Amiga swap

Amiga owner wants to swap public domain software. New stuff only. Also, will sell 512 Kbyte RAM expansion unit (Commodore); \$240 or \$160 without clock; with 3 1/2 inch disk drives, \$350. M. Holder, 40 Mannington Rd, Hawthorn 3122 Vic.; (03) 818 2077.

Microbee

Microbee graphic editor for printmaster. Creates/modifies pictures. Features line, circle and ellipse drawing, invert, mirror draw, erase and move modes. On screen cursor. Joystick compatible. Suits Standard and Premium. On 5 1/4 inch or 3 1/2 inch disk for \$15.90. John Arnold, 36 Victoria St, Rooty Hill 2766 NSW; (02) 625 8950.

Software

Software: Amiga Citydesk desktop publisher (new). Needs 1 Mbyte to print; \$150. Phone (075) 33 0223 before 9 am.

Ignore switch

Switchable write protect ignore switch for Commodore; 5 1/2 inch disk drives. Phone Robert on (07) 284 1429 (after hours).

Atari swap

Wanted to swap: Atari-52D ST, program disks, Public Domain and so on. Geoff Egel, 18 Sturt St, Loxton 5333.

Games

Commodore 64 games for sale. Titles include Exploding Fist, On Court Tennis; from \$5.00. Also quality blank disks. Croydon (03) 723 3402.

Glyphic Software

Poor Person's Write-Hand-Man (\$47) in versions for CP/M 2.2 and 3.0 and for all machines from 8 inch SSSD to Amstrad 3 inch CP/M (and all Microbees 3 1/2 inch or 5 1/4 inch) – if it's CP/M it'll run WHM! Also for CP/M 2.2 and 3.0 are Poor Person's Spooler (\$40), Spread Sheet (\$40), Mailing Label Processor (\$30) and Spelling Checker (\$30) and Xpert Software's Side2/Banner2 (only \$45) for expert sideways (down instead of across printing of wide ASCII documents such as spreadsheets or timetables; also first-class banners in several fonts.

For CP/M 2.2 (for example, all Microbees) there is Xpert's ex-

ceptional quality (85 page manual and valuable support files) Xtrakey program (super value at \$49) for option-packed keyboard redefinition. Xtraprint (\$43) also for CP/M 2.2 (103 page manual!) offering powerful control of all popular printers. Want computing speed or BIOS changes?

We have Mitek's Relocatable Z80 Macro assembler/linker/library manager and screen-based Symbolic Debugger. The entire package including manuals is just \$120 and includes bonus PD Dazzlestar. For MS-DOS (PC, XT, AT and compatibles) there is Xpert's Side2/Banner2 (\$38 – cheap by comparison – but nobody does it better). From Sofcap Incorporated we have professional quality HD Tuneup version 2.03 (\$75), to survey, defragment, compress and optimise hard disks up to 32 Mbytes – stops disk thrash and speeds read/write access. Write or phone for free catalog of all products. Purchase by cheque or Bankcard/Mastercard from Glyphic Software, PO Box 391, Pennant Hills, 2120 or phone (02) 484 3827.

Printer Ribbons

Reconditioned ribbons now available – Epson EX 800 \$13; Epson LQ 1000 \$14; Fujitsu DX 2100 \$18; Imagewriter \$8; NEC P2/P6 \$13; NEC P3/P7 \$15; NEC P5 \$13; SP80 m/strike \$11; Star NL 10 \$11; Toshiba P1350 \$11 and more! These are not reinks, but quality cartridges (some branded) reloaded with new ribbon – guaranteed 'as new' performance. Discounts for quantity; trade ins accepted. Lazarus Ribbons, 70 Wolseley Rd, Mosman NSW 2088.

Printer buffer kits

Nearly 1500 printer buffer kits now sold. Prices start at \$39 for a 256 Kbyte short form kit. All items advertised are in stock. Dealers' enquiries welcome. Bulk discounts. Schools' and government departments' orders accepted. Oh yes! IBM compatible. Australian designed and manufactured. Ideal project for user groups or students. For a free catalog send a 37 cent stamp to Don McKenzie, 29 Ellesmere Crescent, Tullamarine 3043 Vic.

DEALERS, distributors, mail-order houses and other commercial organizations or individuals who have a message to spread can take advantage of our Market Directory – small ads to help those searching for outlets, services and equipment. For details contact *Your Computer* on (02) 693 6626 or write to PO Box 227, Waterloo 2017 NSW. DISPLAY ADVERTISEMENTS (50mm deep x 60mm wide) in the Market Directory are \$125 per insertion if finished artwork is supplied (Set and Makeup is \$40 extra for the first insertion only). Payment must accompany copy. Closing date is 6 weeks prior to the month of publication. □

FREE CLASSIFIEDS are for readers only, not commercial organisations. The first 20 words are accepted free of charge with a charge of 20 cents for each additional word. Good quality black-and-white prints may be included for a charge of \$10 each. Multiple classifieds in one issue are treated and charged as singles.

COMMERCIAL ORGANISATIONS can place classifieds for a charge of 35 cents per word (minimum charge \$10). Black-and-white photographs may be included for a charge of \$20 each.

PRINT OR TYPE your ad clearly and legibly, double-spaced, and separately include your name, address and phone number for checking purposes, even if these are not to be included in the ad. *Any payment due must accompany the copy.*



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Smoke!**

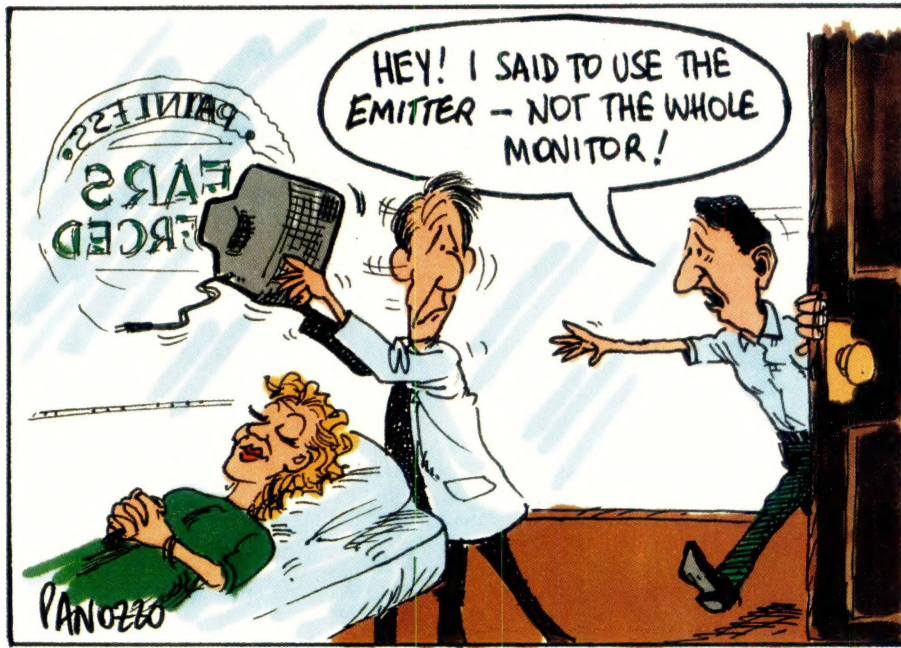
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CURSORY GLANCE



Are you in a tight squeeze? Get yourself a pinion handgrip with digital counter to keep track of your exercise. Yes, it tells you how many times your hand has squeezed. The hand exercise can help develop muscle, improve circulation and promote better health. It doesn't matter what sport you're into, pinion handgrip can help. With digital counter. Just the thing for wankers.

■ I thought I saw my first honest software sales place the other day. Then I saw another. The first was called Rent A Bug, the other Rent A Bomb. Problem was they turned out to be places hiring out old VW beetles and old cars. Just when I thought it was safe to get back into software.

■ I love the way power conditioners, line conditioners and uninterrupted power supply devices are sold. In just 3 milliseconds/1 second and so on you can lose X months or years of data. Of course that's if you don't back it up (But you do, don't you?) and if you and your power supply are unstable, lousy or fail just one once. Mind you, I nearly fell for the scare tactics during the brownouts in Sydney a few years ago when my office was in a building wired up in 1788. And, to be fair, there *are* areas in many cities where power fluctuations are significant. The horror images of the ads often don't show the companies up very well, however.

■ Big software companies are getting serious about software theft now that most have dropped their frustrating copy protection schemes. Almost all have realised that software locking schemes penalise the honest users while the dishonest users get away without a hassle. So now we have FAST, the Federation Against Software Theft. They're advertising (02) 680 3270 as the number to call if you are using software illegally. They say ring it and you can avoid prosecution.

What happens when you ring this number? Well you get David Johnstone, a man with some very sensible ideas on software piracy and a practical approach to prevention by making software companies user friendly. Now there's a different user interface. He is the managing director of Optsoft which handles Enable and various other products. He was the main mover behind FAST and has taken leave from Optsoft to be the executive director of FAST.

■ And just when everybody had given up on those silly gadgets which beep at you when you whistle for your keys, along comes the Amazing Whistle Light. Just give a whistle and the light turns itself on or off. Puts an end to stumbling around in the dark and it's ideal for home, office, caravan, workshop, anywhere except maybe a recording studio.

The phones have run hot (excuse the pun) since FAST started advertising its existence. He says they get calls from people who have hot software and FAST advises them how to make it legitimate. The generic term for making it legitimate seems to be 'buy a real valid copy of the same program', and he does all he can to find an outlet near to the illegitimate person. FAST grants an amnesty from prosecution while they take reasonable time to do so. He says they have other calls from people dobbing in former employers – sweet, eh?

Each of these alleged offenders receives a letter advising them that if they have illegal software they can fix it up or face prosecution. David seems to be taking a firm, gentle approach to the problem. Good luck to him, particularly as he's setting out to get users good ownership contracts, good support services and so on. He is one of the growing number of people who have realised that if the companies look after the buyers, the buyers will look after the companies. That's more businesslike than most people imagine.

Bootstrap

Research in Europe into ergonomics goes further than how you sit. They've looked at vision, hearing and even the sense of smell. On the hearing score, they found that the noise of some hard disks and, particularly, screens at 15 KHz or 15,000 cycles per second was deafening people, giving them headaches and so on. Years ago they found that many monitors emitting a 15 KHz squeal can cause significant problems for younger people and women.

Given that many of the people working computers are women and a lot of them are young, that is not encouraging news. However, some years ago they started producing screens which emit an 18 KHz or higher squeal, thus moving it out of the hearing range of more people.

An enterprising ear-ring manufacturer from the Dutch city of Deffen has decided to apply this to his business. He has developed a device which uses the emitter from a standard old computer screen to pierce ears painlessly, quickly and accurately. The product is called Kilohurts and is available in several models including a Hercules and a VGA, each giving better resolution, finer holes and greater accuracy. If you'd like to know more, give him a buzz. □

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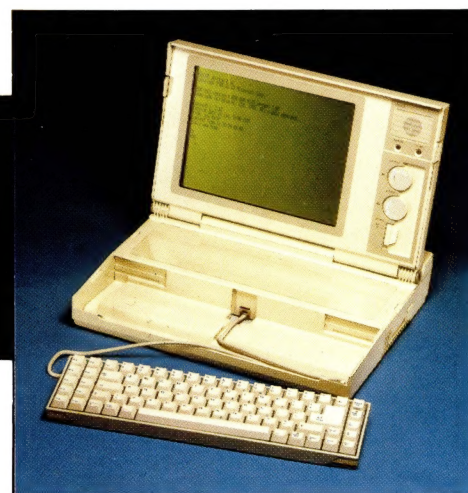
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